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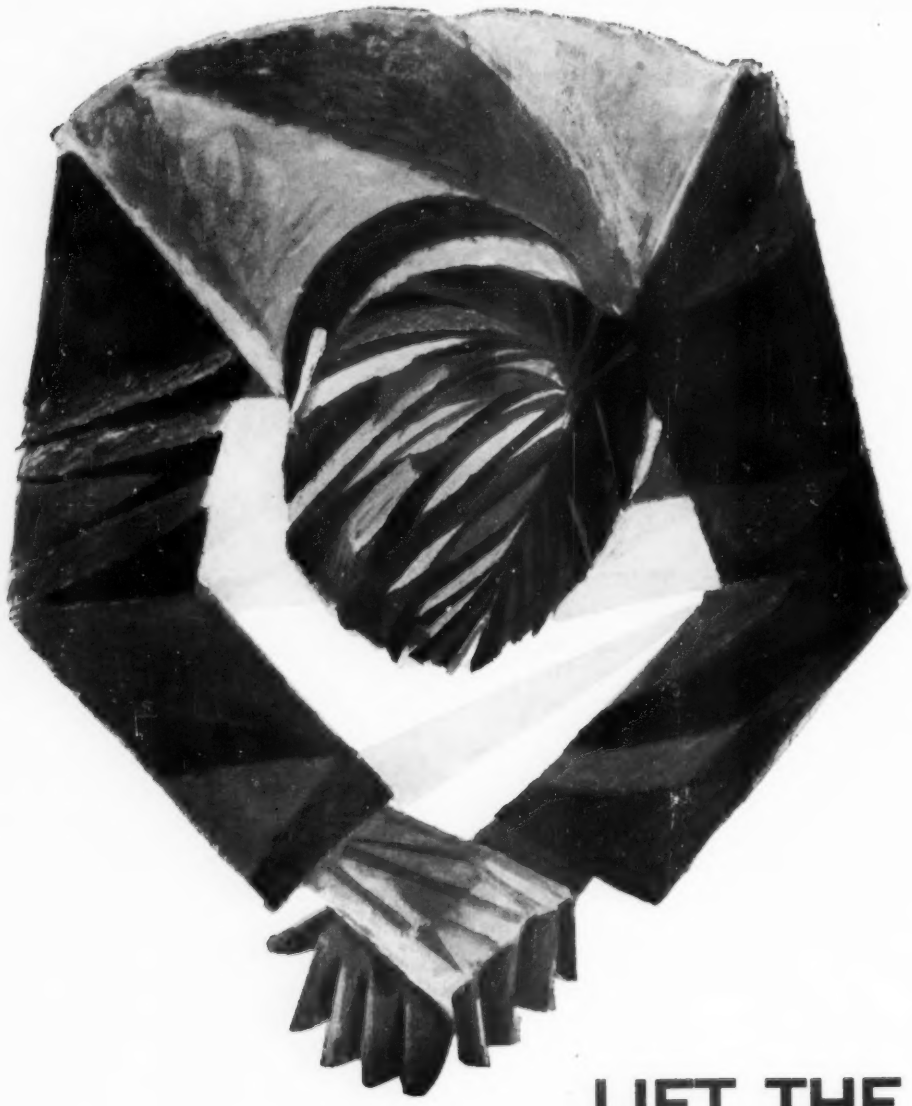

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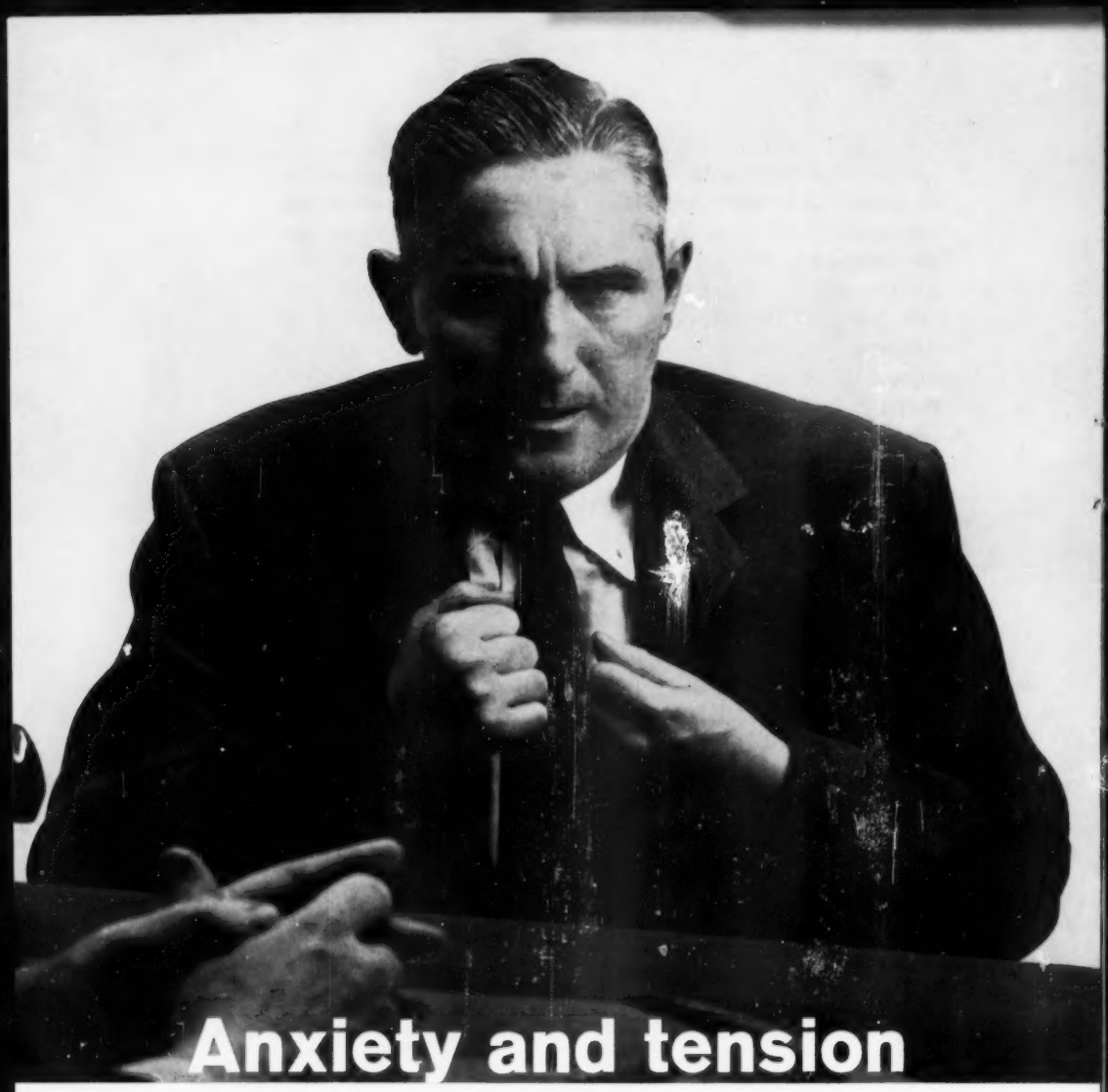

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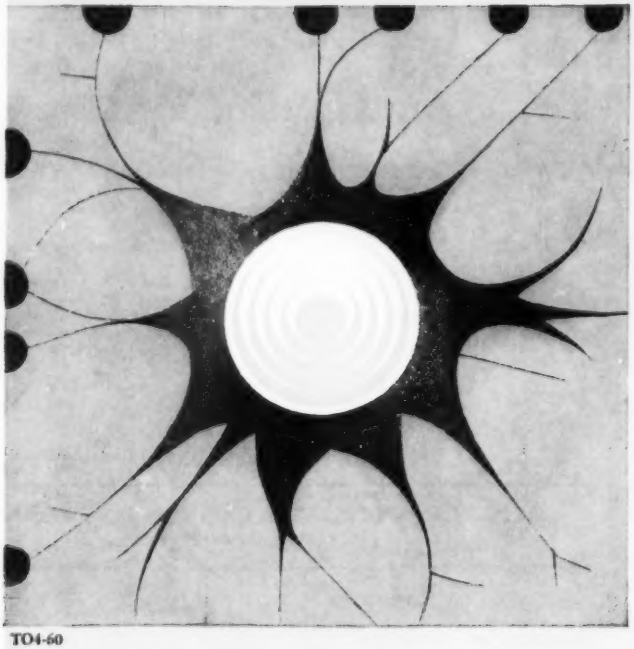

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GENETIC FACTORS IN SCHIZOPHRENIA

IAN GREGORY, M.A., M.D.[1, 2]

Muller(27) has remarked that the heredity-environment controversy is an excellent example of wishful thinking by two sets of fanatical opponents, both of whom ought to know better. Neel and Schull(28) comment that the problem has often been approached with more bias than perspicacity, and that there is a tendency to overemphasize the material with which the observer is familiar. Continuing lack of certain knowledge concerning the etiology of most common forms of mental disorder is often compensated by strong emotional convictions and dogmatic assertions. It is the purpose of the present paper to examine critically certain hypotheses as to the role of genetic factors in the causation of schizophrenia.

It is well established that profound *differences* in human structure and function may result from either predominantly genetic endowment or environmental influences (particularly when the latter act during early stages in maturation). It is perhaps less generally recognized that very *similar* forms of abnormality may arise from different modes of inheritance, or from predominantly environmental experiences (either biological or psychosocial in nature). The significance of genetics in psychiatry is most clearly seen when rare hereditary traits are examined, such as Huntington's chorea or phenylketonuria, and the influence of heredity in the causation of the common mental illnesses is much more obscure(30). However, there is widespread agreement concerning the role of genetic factors in the determination of intelligence and mental deficiency (oligophrenia).

In spite of certain difficulties in definition and precise measurement, it is generally accepted that intelligence has a continuous frequency distribution in the population that corresponds closely with the normal or Gaussian curve. This quantitative variation has heritable and non-heritable determinants, the former being attributed to polygenes that are considered responsible for some 50 to 75% of the total variability(3, 33). The bulk of high-grade mental deficiency (associated with an Intelligence Quotient greater than about 50, and largely unaccompanied by gross brain pathology), corresponds with the lower end of the normal frequency distribution of intelligence. The bulk of low-grade mental deficiency, on the other hand, consists of a variety of clinical entities, commonly associated with gross brain pathology, attributable in some instances to environmental agencies (*e.g.*, anoxia, trauma or infection) and in others to major genes (*e.g.*, simple recessive inheritance in amaurotic idiocy, phenylketonuria, true microcephaly and gargoylism).

The importance of genetic factors in the etiology of other degenerations of the central nervous system is well recognized(36). However, with the single exception of the organic psychosis associated with Huntington's chorea, which is transmitted by a single dominant gene (31, 32), the role of genetic factors in psychiatric disorders having their clinical onset during adult life is far less accurately established.

It has long been known that "functional" psychoses, psychoneuroses and other deviations of personality and behavior may be found in much higher frequencies among the relatives of affected individuals than in the population at large. Such intrafamilial concentration, however, has been variously attributed to three different types of causation :—(a) similar genetic predisposition, (b) direct non-genetic transmission of disease-producing agents or experiences, (c) the sharing of similar exposures in a pathogenic environment.

In order to examine genetic hypotheses of causation, two main approaches have

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[2] I am most grateful to Dr. William J. Schull, Associate Professor of Human Genetics at the University of Mich., for helpful criticism and suggestions.

been adopted, either separately or in conjunction: 1. The investigation of twins including at least one affected member, 2. The estimation of frequencies of abnormality in various classes of relatives. Much more extensive data of both kinds are available on schizophrenia than on any other form of "functional" psychiatric disorder, due probably to two special sets of circumstances: 1. A presumed high degree of ascertainment, such cases tending to manifest severe and persistent signs of abnormality, which have traditionally led to admission to mental institutions, 2. The relatively high frequency of this diagnosis among both admissions and total population of such institutions (approximately 50% of the latter, due to early onset and tendency to chronicity).

STUDIES ON TWINS

The genetic studies best known to psychiatrists in this country are probably those attempting to compare frequencies of schizophrenia in monozygotic and dizygotic cotwins of individuals diagnosed as schizophrenic. Theoretically, differences in the frequencies of concordance between the two types of twins might be expected to provide an accurate measurement of relative contributions of genetic and environmental factors, but there are a number of serious methodological difficulties which will be discussed below.

A rough index of the proportion of phenotype variance attributable to "heredity" is obtained from the following formula (28):—

$$H = \frac{CMZ-CDZ}{100-CDZ},$$

where CMZ and CDZ are the percentages of concordant MZ and DZ twins respectively. The results of applying this formula to data recorded by 5 investigators and tabulated by Kallmann (1953) are shown in Table 1, from which we might be tempted to conclude that the contribution of genetic factors in the development of schizophrenia is slightly higher than in the determination of intelligence.

It should be emphasized, however, that the validity of these studies is open to the following serious doubts(28, 42).

1. *The diagnosis of schizophrenia* is not made by objective laboratory tests, but on the basis of clinical criteria that vary somewhat from one psychiatrist to another. Data recorded by Elkind and Doering and reproduced by Gruenberg(16) show a discrepancy of approximately 30% between diagnoses of schizophrenia (and other psychiatric disorders) made on the same individuals at Boston Psychopathic Hospital and various Massachusetts State Hospitals. It is to be hoped that there has been some improvement in uniformity of psychiatric diagnoses during the past 30 years, but Böök(2) suggests that some of Kallmann's recorded cases of schizophrenia would not have been diagnosed as such by European psychiatrists. Moreover, the problem of unconscious bias is introduced when the diagnosis of one twin is made with full knowledge of the status (and presumably diagnosis) of the twin partner. This is true whether diagnoses are made by the investigator at the time of entry of propositi into the study, or revised after some years of observation as in a number of Kallmann's cases.

2. *The diagnosis of zygosity.* Using modern serological techniques to investigate twins and other close relatives (preferably both parents and siblings), it is possible to arrive at accurate probability statements as to zygosity(28). It is not yet established how closely the results of traditional methods of zygosity determination correspond with those of the more sophisticated serological techniques. However, Walker and Reid(42) made the following comments regarding Slater's(38) scrupulously documented study of psychotic and neurotic illnesses in twins:

> . . . The differentiation between uniovular and binovular twins was based, in part, on similarity or history of similarity, and, in part, on anthropometric measurements such as digital patterns, height, hair color, eye color, and skull measurements. Unless the report is examined critically, the reader may fail to notice the large proportion of instances where the diagnosis of zygosity was based only on the first criterion—sometimes on photographs or hearsay, both of which can be misleading. This is illustrated by the fact that of the true total of 61 uniovular twins there were 26 pairs for whom no fingerprints were available; these

TABLE 1

ESTIMATED CONCORDANCE RATES IN MONOZYGOTIC AND DIZYGOTIC COTWINS OF SCHIZOPHRENICS [a]

Investigator	*Apparent Zygosity of Twins*	*Number of Pairs*	*Estimated Concordance Rate Percent*	$H=\frac{CMZ-CDZ}{100-CDZ}$
Luxenburger, 1930	MZ	21	66.6	0.655
	DZ	60	3.3	
Rosanoff, 1934	MZ	41	67.0	0.633
	DZ	101	10.0	
Essen-Möller, 1941	MZ	7	71.4	0.657
	DZ	24	16.7	
Slater, 1953	MZ	41	76.3	0.723
	DZ	115	14.4	
Kallmann, 1953	MZ	268	86.2	0.839
	DZ	685	14.5	

[a] Modified after Kallmann (1953), Table 14, Page 145.

are all designated "? Uniovular." In any case, to base a diagnosis of zygosity on the dermatoglyphics of fingerprints alone (disregarding palmar and plantar configurations) is open to question.

Walker and Reid also pointed out that in a number of instances the verdict of an objective criterion such as fingerprints was ignored, and they cite two specific cases (involving three propositi, all classified as uniovular and concordant for schizophrenia) in which they regarded zygosity as definitely misdiagnosed.

3. A further point raised by these reviewers concerned the *procedure of counting twin pairs twice wherever a pair contains two propositi.* This procedure has been used by both Slater and Kallmann and is considered appropriate, *provided* the abnormal individuals have been detected independently of one another (which may be difficult to judge in certain cases).

A number of potentially serious sources of bias in twin studies have been discussed in some detail by Neel and Schull(28), and may be grouped as follows:

4. *Unequal probabilities of ascertainment* of the two classes of twins.

5. *Biological biases with prenatal or natal onset* (natal factors, lateral inversions, and the effects of mutual circulation).

6. *Biases of postnatal onset* (due to greater environmental similarities for MZ than DZ twins).

In view of all the preceding difficulties, it must be concluded that the results of twin studies hitherto conducted leave considerable doubt concerning the precise contribution of genetic factors in the etiology of schizophrenia. An attempt will now be made to examine the evidence derived from recorded frequencies of schizophrenia in the relatives of schizophrenics.

THEORETICAL AND RECORDED FREQUENCIES OF SCHIZOPHRENIA IN RELATIVES OF SCHIZOPHRENICS

By combining data obtained in the course of his own extensive longitudinal study with those recorded in 19 other European investigations, Fremming(11) estimated the lifelong expectation of schizophrenia in the general population as 0.80 ± 0.08%, a figure which has found wide acceptance both in Europe and North America. (Rates in the two sexes did not differ significantly). On the basis of this estimate, the theoretical expectancy of schizophrenia may be

TABLE 2

THEORETICAL EXPECTANCIES OF SCHIZOPHRENIA, IF INHERITED THROUGH COMPLETELY DOMINANT OR RECESSIVE AUTOSOMAL GENES, AND FREQUENCIES RECORDED BY VARIOUS INVESTIGATORS

Category	*Theoretical Expectancy if Inherited Through*		*Frequencies Recorded (Corrected for Age) with Standard Errors*
	Completely Dominant Gene	*Completely Recessive Gene*	
General population	——	——	0.008 ± 0.0008 (Fremming, 1951)
Children of first cousins	0.008	0.013	0.011 (quoted by Slater, 1958)
Relatives of schizophrenics [a]			
Parents	0.503	0.089	0.093 ± 0.008 (Kallmann, 1950) 0.041 ± 0.011 (Slater, 1953)
Children (b)	0.503	0.089	0.164 ± 0.013 (Kallmann, 1938)
Children of *two* schizophrenics	0.751	1.000	0.634 ± 0.075 (Kallmann, 1938) 0.454 ± 0.063 (Schulz, 1940) 0.392 ± 0.130 (Elsässer, 1952)
Full siblings	0.503	0.297	0.142 ± 0.008 (Kallmann, 1950) 0.054 ± 0.009 (Slater, 1953)
DZ cotwins	0.503	0.297	0.003 to 0.167 } See Table 1
MZ cotwins	1.000	1.000	0.666 to 0.862 } See Table 1
Half siblings	0.256	0.152	0.071 ± 0.029 (Kallmann, 1950)
Nephews & nieces	0.252	0.047	0.039 (quoted by Kallmann, 1946)
First cousins	0.133	0.028	0.026 (quoted by Kallmann, 1946)

(a) Ascertained through affected individuals.
(b) Children of either one or two schizophrenics.

calculated for different classes of relative, under various hypothetical modes of genetic transmission (involving varying gene frequencies and rates of manifestation in homozygotes and/or heterozygotes).

Theoretical expectancies in relatives, under the alternative hypotheses of simple monohybrid autosomal dominance or recessivity (each with complete penetrance and expressivity) are shown in Table 2, together with the actual estimates recorded by various investigators. It is evident that the latter do not conform with the theoretical expectancies under either of these simple hypotheses, but they appear closer to the expectancies associated with the hypothesis of complete recessivity than to those associated with complete dominance.

Under the hypothesis of simple recessivity, the theoretical expectation of schizophrenia in MZ cotwins, and in the children of two schizophrenics, is 100%, whereas recorded estimates (corrected for age) are considerably lower. Kallmann (19, 20, 21, 22) has long maintained that the potentiality for schizophrenia is inherited as a simple recessive unit characteristic with incomplete penetrance and expressivity, determined by "a genetically non-specific constitutional defense mechanism" (polygenic in nature). He cites as evidence the distribution of the trait in affected families, and also an excess of consanguineous marriages among the parents of schizophrenics

(approximately 5% of his American index cases being offspring of consanguineous matings).

Böök(2), however, points out that under this hypothesis the frequency in children should not be higher than in siblings, and the risk in siblings with one schizophrenic parent should be higher than in those with two normal parents (not found by Kallmann). He also argues that it would be necessary to assume an assortative mating of 94%, and that the high rate of consanguinity would not be expected for a genetic trait with a frequency as high as nearly 1%.

During the course of his own extensive and careful study of a North Swedish isolate, Böök recorded the following estimates of morbid risks: population 3%, parents 12%, siblings of propositi of two non-schizophrenic parents 9%, and siblings of propositi of one schizophrenic and one non-schizophrenic parent 12%. He examined three alternative monohybrid genetic hypotheses, involving 1. Recessivity with variable penetrance in the homozygote, 2. Partial dominance with equal variable penetrance in heterozygote and homozygote, 3. Partial dominance with variable penetrance in the heterozygote and 100% penetrance in the homozygote. From his analysis he concluded that "the type of schizophrenia prevalent in the investigation area was due primarily to a major simple dominant gene with a heterozygous penetrance of about 20% and a homozygous penetrance of about 100%. The frequency of the gene in the population was estimated at about 7%."

The present writer, however, considers that Böök's three *formulae for morbid risks of schizophrenia in parents of schizophrenics are incorrect* (and hence also the estimates of gene frequency he derived from them, and applied in computing morbid risks in siblings). In each instance the formulae he presented as "frequency of affected individuals among parents of schizophrenics" appear to be in fact the *a priori* expectancies of affected children *from all matings capable of producing affected offspring*. Observed frequencies in parents of schizophrenics are, however, obtained *a posteriori* through their affected offspring, and it therefore appears appropriate to derive the relevant theoretical expectancies by means of Bayes' theorem. If this is done, is may be shown that these *a posteriori* expectancies in the parents of affected individuals are in fact identical with the *a priori* expectancies in the children of these same affected persons. The following is a general statement of the relevant expectancies for the case of two alleles A and a having frequencies p and q (= 1-p) respectively :—

The probabilities (expectancies) of the various genotypes in parents *and* children of an AA individual are p (AA) : q (Aa) : O (aa), the probabilities in parents *and* children of an Aa individual are ½p (AA) : ½ (Aa) : ½q (aa), and the probabilities in parents *and* children of an aa individual are O (AA) : p (Aa) : q (aa). It may also be shown that phenotypic expectancies are the same in parents and children of given individuals, regardless of considerations of dominance and penetrance.

It is now proposed to examine briefly certain *expected frequencies of schizophrenia in relatives of schizophrenics, under three hypotheses involving variable rates of manifestation in heterozygote and/or homozygote.* For this purpose, the existence of a Hardy-Weinberg equilibrium is assumed (but will be discussed subsequently). In each situation the normal gene has been designated as A, occurring with frequency p in the population, and the gene assumed responsible for schizophrenia as a, with frequency q (= 1-p). The rate of manifestation (under the conditions specified for each hypothesis) has been recorded as m, each numerical value of which is associated with a single numerical value for q. The frequency of schizophrenia in the population (= s) is assumed throughout to be 0.008.

Hypothesis A. Simple recessivity with incomplete manifestation (m) in homozygote. (Table 3, Figure 1)

Three of the 4 phenotypes will be normal (AA, Aa, aa_o) and the remaining one schizophrenic (aa_m). Phenotypic frequencies in the population will be p^2 (AA): 2 pq (Aa) : $(1\text{-}m)q^2$ (aa_o) : mq^2 (aa_m).

Formulae for the theoretical expectancies of schizophrenia in relatives of schizophrenics are listed in Table 3, and those

for parents, children and siblings are depicted graphically in Figure 1 (according to gene frequency and rate of manifestation). It may be noted that expectancies for siblings are higher than those for parents and children (of one or two schizophrenics) for all values of m and q, the latter being contrary to recorded findings (Table 2).

Hypothesis B. Partial dominance with complete manifestation in homozygote but incomplete manifestation (m) in heterozygote. (Table 4, Figure 2).

Two of the 4 phenotypes will be normal (AA, Aa_o) and the other two schizophrenic (Aa_m, aa). Phenotypic frequencies in the population will be p^2 (AA) : (1-m)2pq (Aa_o) : 2mpq (Aa_m) : q^2 (aa).

This was the third hypothesis examined by Böök in generating theoretical expectancies for different classes of siblings, and the one with which he considered his data corresponded most closely. However, attention may be drawn to what appears to be a minor error in Table 39 on page 89 of his article. It is suggested that the expected frequency of affected children from his fifth type of mating (DR_m X DR_m) should be $d^2r^2p^2 + 2\ d^2r^2p^3$ (the final exponent

FIG. 1

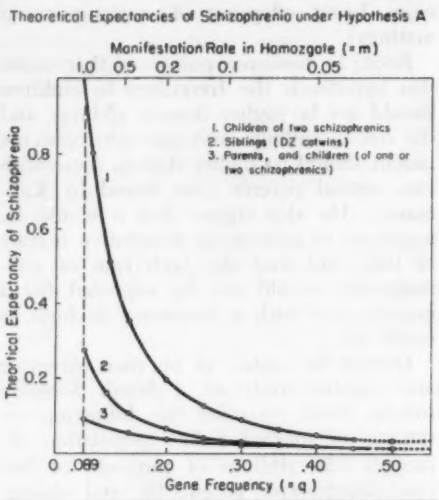
Theoretical Expectancies of Schizophrenia under Hypothesis A
Manifestation Rate in Homozgote (= m)
1.0 0.5 0.2 0.1 0.05
1. Children of two schizophrenics
2. Siblings (DZ cotwins)
3. Parents, and children (of one or two schizophrenics)
Theoretical Expectancy of Schizophrenia
0.8
0.6
0.4
0.2
0 .089 .20 .30 .40 .50
Gene Frequency (= q)

TABLE 3

THEORETICAL EXPECTANCIES OF SCHIZOPHRENIA UNDER HYPOTHESIS A : MONOHYBRID AUTOSOMAL RECESSIVITY, WITH INCOMPLETE MANIFESTATION IN HOMOZYGOUS INDIVIDUALS

Category	*Theoretical Expectancy of Schizophrenia*[a]
General population	$mq^2 = s \cong 0.008$
Children of first cousins	$\frac{1}{16}(mq+15s)$
Relatives of schizophrenics [b]	
Parents, and Children [c]	mq
Children of *two* schizophrenics	m
Full siblings, and DZ cotwins	$\frac{m}{(2-q)^2} = E$
MZ cotwins	Not less than m
Half siblings	$\frac{1}{2}(E + s)$
First cousins	$\frac{1}{4}(mq + 3s)$

(a) Where s is the frequency of schizophrenia in the general population ($\cong 0.008$), q is the frequency of the gene assumed responsible for schizophrenia, and m is the manifestation rate of schizophrenia in persons homozygous for this gene.

(b) Ascertained through affected individuals.

(c) Children of either one or two schizophrenics.

being 3 instead of 2). When this correction is made, the total affected children from all matings reduces to the anticipated value of $d^2 + 2dp(1-d)$, which is simply the expectancy of schizophrenia in the general population (according to Böök's notation).

Although formulae obtained by this method are equivalent to those derived by Slater (38) under the same hypothesis, the latter author used a simplified approach on which Table 4 and Figure 2 have been based. In these theoretical expectancies, h is the proportion of schizophrenics who would be homozygous, given a certain manifestation rate and associated gene frequency. In the symbols of the present study $h=q^2/(q^2+2mpq)=q^2/s=q^2/0.008$.

Slater cited several recorded frequencies in children and siblings of schizophrenics, that roughly corresponded with theoretical expectancies (under this hypothesis) asso-

FIG. 2

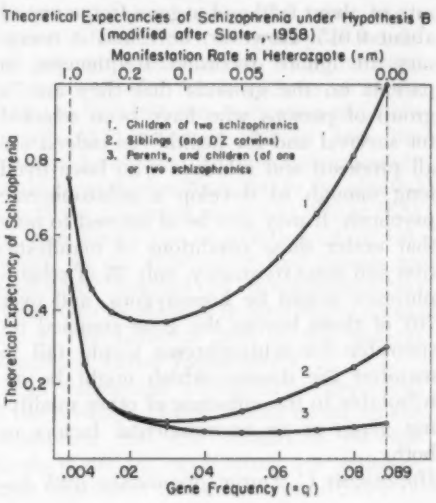

TABLE 4

THEORETICAL EXPECTANCIES OF SCHIZOPHRENIA UNDER HYPOTHESIS B: MONOHYBRID AUTOSOMAL DOMINANCE WITH COMPLETE HOMOZYGOUS MANIFESTATION, BUT INCOMPLETE MANIFESTATION IN HETEROZYGOUS PERSONS

Category	*Theoretical Expectancy of Schizophrenia*[a, b]
General population	$q^2 + 2mq(1-q) = s \cong 0.008$
Children of first cousins	$\frac{1}{16}(q+15s)$
Relatives of schizophrenics [c]	
Parents, and Children [d]	$\frac{1}{2}(1+h)(m+q)$-hmq
Children of *two* schizophrenics	$\frac{1}{4}(1+h)\{2m(1-h)+1+h\}$
Full siblings, and DZ cotwins	$\frac{1}{4}\{2m+h+q(2m+h+1-2mh)+q^2(1-2m)\} = E$
MZ cotwins	Not less than $h + m(1-h)$
Half siblings	$\frac{1}{2}(E+s)$
First cousins	$\frac{1}{8}\{(1+h)(m+q)+(7-h)(s+mq^2)\}$

(a) Where s is the frequency of schizophrenia in the general population ($\cong 0.008$), q is the frequency of the gene assumed responsible for schizophrenia, m is the manifestation rate of schizophrenia in persons heterozygous for this gene, and h is the proportion of schizophrenics who are homozygous ($=q^2/s$).

(b) The first five formulae correspond with those derived by Slater (1958) under this hypothesis.

(c) Ascertained through affected individuals.

(d) Children of either one or two schizophrenics.

ciated with a heterozygous manifestation rate of about 0.26 and a gene frequency of about 0.015. However, he found it necessary to ignore recorded frequencies in parents on the grounds that they are "a group of persons who have been selected for survival and for health"—as indeed are all propositi and relatives who have lived long enough to develop a schizophrenic psychosis. It may also be of interest to note that under these conditions of manifestation and gene frequency, only 3% of schizophrenics would be homozygous, and over 70% of those having the gene assumed responsible for schizophrenia would fail to manifest the disease—which might be attributable to the influence of other modifying genes or to environmental factors or both.

Hypothesis C. Partial dominance with ho-

FIG. 3

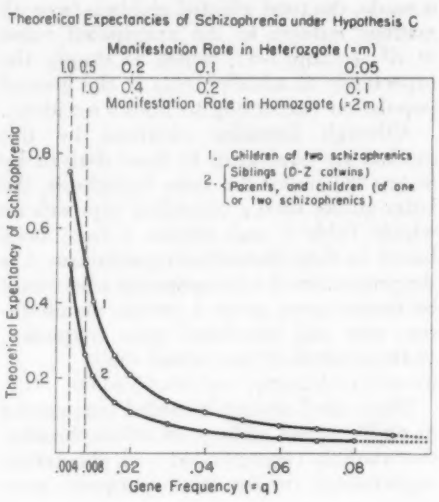

TABLE 5

THEORETICAL EXPECTANCIES OF SCHIZOPHRENIA UNDER HYPOTHESIS C: MONOHYBRID AUTOSOMAL PARTIAL DOMINANCE, WITH MANIFESTATION RATE IN HOMOZYGOTES DOUBLE THAT IN HETEROZYGOUS INDIVIDUALS

Category	*Theoretical Expectancy of Schizophrenia*[a]
General population	$2mq = s \cong 0.008$
Children of first cousins	s
Relatives of schizophrenics [b]	
Parents, and Children [c]	$\frac{1}{2}m(1+3q)$
Children of *two* schizophrenics	$m(1+q)$
Full siblings, and DZ cotwins	$\frac{m(1+q^3)+s(2-q)}{2+q(1-q)} = E$
MZ cotwins	Not less than $m(1+q)$
Half siblings	$\frac{1}{2}(E+s)$
First cousins	$\frac{1}{8}m(1+17q+7q^2-q^3)$

(a) Where s is the frequency of schizophrenia in the general population ($\cong 0.008$), q is the frequency of the gene assumed responsible for schizophrenia, $m(\leq 0.5)$ is the manifestation rate of schizophrenia in persons heterozygous for this gene, and $2m(\leq 1.0)$ is the manifestation rate in homozygous individuals.

(b) Ascertained through affected individuals.

(c) Children of either one or two schizophrenics.

mozygous manifestation rate ($2m \leq 1.0$) *double that of heterozygous rate of manifestation* ($m \leq 0.5$). (Table 5, Figure 3.)

The second of Böök's three hypotheses concerned the assumption of equal penetrance in both homozygote and heterozygote. This possibility appears much less likely than that of the assumptions just considered under hypothesis B. However, another plausible hypothesis would appear to be that of penetrance (and/or expressivity) proportional to the number of pathological genes present, and this situation will now be examined.

Five phenotypes must be considered, three of which will be normal (AA, Aa_o, aa_o) and two schizophrenic (Aa_m, aa_m). The phenotypic frequencies in the population (for $m \leq 0.5$) will be p^2 (AA) : $(1-m)2pq$ (Aa_o) : $2mpq$ (Aa_m) : $1-2m)q^2$ (aa_o) : $2mq^2$ (aa_m).

The proportion of schizophrenics that are homozygous will in this case be equal to the gene frequency (q), and it is quite convenient to derive theoretical expectancies by means of Böök's method of exhaustive enumeration. The types of mating (from which affected offspring arise) are in fact identical with those listed in table 38 on page 88 of his article, but the expected frequencies of most matings and affected children are somewhat different.

Theoretical expectancies in relatives are recorded in Table 5, and those for parents, children and siblings depicted graphically in Figure 3. In this instance, the expectancies in siblings are not appreciably different from those in parents or children for all rates of manifestation (as is the case under hypothesis B for relatively high rates of manifestation and low gene frequencies). However, the lower expectancies in the children of two schizophrenic parents under hypothesis C result in a poorer fit with observed frequencies than that obtained under hypothesis B and discussed above.

CONSANGUINITY, HARDY-WEINBERG EQUILIBRIUM, ASSORTATIVE MATING, MORTALITY, FERTILITY AND MUTATION

It was mentioned previously that Kallmann has cited a high rate (5%) of *consanguinity* (unspecified) between parents of schizophrenics in support of his hypothesis of recessivity—and that Böök has pointed out this would not be expected in a genetic trait with a frequency of nearly one percent. Assuming the minimum gene frequency (under the hypothesis of recessivity) to be 0.089, the application of Lenz's formula(18) indicates that in fact the expected frequency of first-cousin marriage would be no higher than that in the general population (which is about 1%). Slater (38) has also found the expectation of schizophrenia in the children of first cousins an insensitive measure of dominance-recessivity under hypothesis B (and this expectation is the same as that in the general population under hypothesis C.).

The theoretical expectancies presented in the previous section are all based on the assumption that the conditions for the *Hardy-Weinberg equilibrium* are satisfied, these conditions being as follows(28) :

1. No tendency for like genotypes to mate *i.e.*, random mating), and all matings equally fertile.
2. The absence of selection for or against any of the genotypes involved.
3. Stability of the gene (*i.e.*, no mutation).
4. Non-overlapping generations.
5. An infinitely large population.

However, there is evidence suggesting that the first 3 of these criteria are violated in the case of schizophrenia. Thus, it has been established that people tend to select mates of similar intelligence, and there is reason to suspect *assortative* mating in persons predisposed to certain forms of mental disorder, including schizophrenia(15, 29).

Moreover, schizophrenics are subject to strong negative selection on account of both high mortality and low fertility. The *mortality* some years ago was estimated as from two to three times that of the corresponding general population(1, 9, 26). Data from several further investigations indicate that the *reproductive fitness* of schizophrenics is not greater than 0.70 (2, 4, 5, 9), due mainly to selection against marriage of schizophrenic males, but also in at least one study to diminished fertility of married schizophrenic females.

In view of the evident selection against schizophrenia, there are three possible

explanations of its apparently undiminished prevalence(24).

1. It is not, or some varieties of it are not, hereditary.

2. Outwardly healthy carriers of pathological genes might reproduce at a higher rate than normal—a possibility that seems to have been excluded by studies on the fertility of siblings of schizophrenics(9, 19).

3. The pool of pathological genes might be constantly augmented by means of *mutation*. Böök estimated the mutation rate in his North Swedish isolate as 5×10^{-3} (or 1 in 200) genes per generation. Estimates of a similar high order of magnitude have been considered generally applicable by other authorities(33), and would be required by the monohybrid hypotheses examined earlier.

ALTERNATIVE HYPOTHESES

Several leading geneticists have remarked on the impossibility of forcing the data on schizophrenia into a simple Mendelian pattern of inheritance(30, 37). The present writer is now convinced that, even when modified by various degrees of penetrance and expressivity, no monogenic hypothesis is compatible with all the data recorded.

Three alternative hypotheses (that are *not* mutually exclusive) may be considered briefly:

1. *That schizophrenia is predominantly determined by environmental influences.* There is much more theory than fact relating to this proposition, but a number of studies have been made of such objective data as parental ages, permanent loss of parents, family size, birth order, ordinal position and sex of siblings(12, 13, 14).

2. *That the genetic component of the schizophrenic syndrome is heterogeneous,* and includes two or more types, each transmitted by different genetic mechanisms(37). In view of the difficulties in the genetic analysis of schizophrenia, detailed evidence in support of this hypothesis is lacking at the present time, but some interesting data have recently been presented (43).

3. *That at least part of the genetic component of schizophrenia is polygenic in nature.* In this connection, several associations appear to exist between schizophrenia and presumed polygenic systems—such as genetic determinants of intelligence, resistance to bodily disease, and somatotype.

It is recognized that individual patients with schizophrenia may have very superior *intelligence,* and also that the disease itself is apt to be accompanied by marked deterioration in intellectual function. However, Terman(40) has shown an association between high childhood intelligence and low adult rates of mental illness (and also mortality). Dewan(6) has demonstrated an association between intellectual performance at induction, and subsequent psychiatric discharge from the Canadian army. Larsson and Sjögren(23) have reported an unduly high frequency of concurrent oligophrenia and schizophrenia, and discussed the possibility of a genetic connection between these disorders.

Since intelligence is also related to *socio-economic status*(40), such a connection between schizophrenia and intelligence would be quite compatible with studies indicating the frequency of schizophrenia to be inversely related to social class(17). The *increased mortality of mothers* during the early childhood of schizophrenics may also be associated with the latter relationship to social class(13, 14).

Attention has already been drawn to the relatively high *mortality* recorded in patients with schizophrenia. This may be at least partly related to *impaired resistance* to tuberculosis(22) and *deficient immune responses* to other infections(7, 41). Evidence of some association with *somatotype* is extensive, but controversial(22).

In discussing *the testing of complex data for agreement with a simple genetic hypothesis,* Neel and Schull point out that there are diseases with a hereditary element in whose study one may encounter several simultaneous statistical problems, such as incomplete penetrance, a variable age of onset, and an uncertain degree of ascertainment (and at the same time also genetic heterogeneity). They conclude that there are times when the proper genetic analysis of a given disease must await certain medical advances, and that the student of human genetics should become familiar

with the limitations of his approach and the data with which he works.

Penrose(30) has enumerated the principles of investigation to be applied to the particular problem of the genetics of mental disorder, and has rightly concluded that until these things are done on a large scale most of our theories about inheritance of psychoses will remain in the realm of speculation.

Summary

It is generally accepted that intelligence in the general population, and high-grade mental deficiency, are largely determined by the cumulative effects of polygenes. Simple Mendelian inheritance is well established as causative of certain forms of (usually) low-grade mental deficiency, and other degenerations involving the central nervous system, including Huntington's chorea.

There is still considerable doubt concerning the significance of genetic factors in the etiology of "functional" psychiatric disorders. Schizophrenia has been extensively studied by means of twin and family data, but the extent and nature of possible genetic factors in this syndrome remain uncertain.

Twin studies suggest that heredity may be slightly more important in predisposing to schizophrenia than in determining intelligence, but these studies are complicated by very serious methodological difficulties, some of which have been discussed.

The frequency of schizophrenia is significantly greater in families of schizophrenics than in the general population, but observed frequencies in different classes of relatives do not conform with those expected on the basis of simple Mendelian dominance or recessivity.

Expected frequencies in various classes of relatives have been examined under each of three hypotheses involving incomplete penetrance and/or expressivity (in homozygote and/or heterozygote). Data on consanguinity, assortative mating, mortality and fertility have been outlined.

It has been concluded that no monogenic hypothesis is compatible with all the data recorded, and three alternatives (that are *not* mutually exclusive) have been briefly considered : 1. Predominantly environmental causation, 2. Genetic heterogeneity, 3. Polygenic inheritance.

Statistical associations between schizophrenia and limited intelligence, inferior socio-economic status, maternal mortality, and immunological or other somatic characteristics of schizophrenics, are all compatible with the latter hypotheses.

The data recorded on schizophrenia are complex and do not conform with any simple genetic hypothesis. Pending the results of considerable further investigation, theories concerning the role of possible genetic factors in the development of schizophrenia and other "functional" psychiatric disorders will remain in the realm of speculation.

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EVALUATION OF TRANQUILIZING DRUGS IN THE MANAGEMENT OF ACUTE MENTAL DISTURBANCE [1]

D. WILFRED ABSE, M.D., W. G. DAHLSTROM, PH.D. AND A. G. TOLLEY, M.D. [2]

In 1956, a preliminary report of the present research project [3] was published(1) based on a small group of 36 subjects studied over the period of a week. Each patient in the study was felt to be in need of day-time sedation because of excessive tension, anxiety or emotional disturbance causing severe personal discomfort or difficulties in ward management while hospitalized for short-term intensive psychiatric treatment. Each was assigned to one treatment (reserpine, powdered opium, or placebo) on a random basis and given a fixed dosage without the patient or staff knowing the drug being administered. All medication was dispensed in equal numbers of identical capsules such that patients received 2 capsules 4 times daily for the first 2 days and then 1 capsule q.i.d. for the remainder of the medication period. This provided a total daily dose of reserpine of 8 mg. for the first 2 days, then 4 mg. daily and for powdered opium 400 mg. the first 2 days, then 200 mg. daily. Lactose was dispensed in equal numbers of capsules. Data from daily nursing checklists, psychiatric ratings and checklists and psychological testing were reported, most of which suggested that the patients were all improving during the period of observation without any one treatment showing any clear advantage over the others. That is, for this group of acutely disturbed patients, reserpine did not appear to show any special benefit not obtained by standard ward care and the semblance of medication. Several questions were obviously left open in the previous report: the dosage chosen may well have been on the average too low to be physiologically effective for this kind of patient; the period of time may not have been sufficient to allow the tranquilizer to reach optimal effectiveness; reserpine may be inferior to other tranquilizing agents for the management of these disorders. The present report offers additional evidence on each of these questions.

Since the initial report, a total of 68 patients have been studied in the reserpine series and a second series involving 30 patients added to the project comparing chlorpromazine with the standard drug (powdered opium) and the inert placebo (lactose). The dosage level for chlorpromazine was set at 600 mg. for the first 2 days and then 300 mg. daily. In addition it has been possible to study some of the cases over a longer interval than a week. The same evaluative procedures, cautions for patient safety and secrecy concerning the drug used, and objectivity in assessing the changes noted have been adhered to in these subsequent procedures.

[1] Read at the 115th annual meeting of the American Psychiatric Association, Philadelphia, Pa., Apr. 27-May 1, 1959.

[2] Department of Psychiatry, University of North Carolina, Chapel Hill, N. C.

[3] This study was carried out under U.S.P.H. Grant Number MY-1870.

TABLE 1

MEAN BLOOD PRESSURE READINGS BEFORE AND AT TWO DAY INTERVALS AFTER MEDICATION. (SIX CASES IN EACH GROUP.)

	CHLORPROMAZINE		*RESERPINE*		*POWDERED OPIUM*		*PLACEBO*	
Time	*Syst.*	*Diastol.*	*Syst.*	*Diastol.*	*Syst.*	*Diastol.*	*Syst.*	*Diastol.*
Initial	132.7	85.3	139.8	88.8	118.0	72.7	140.3	88.0
3rd day	118.7	75.3	120.7	77.3	113.3	70.0	134.0	83.3
5th day	116.7	75.3	112.0	69.3	118.3	71.2	130.0	78.0
7th day	110.7	69.3	116.0	72.7	113.3	70.0	118.7	75.3

PHYSIOLOGICAL MEASURES

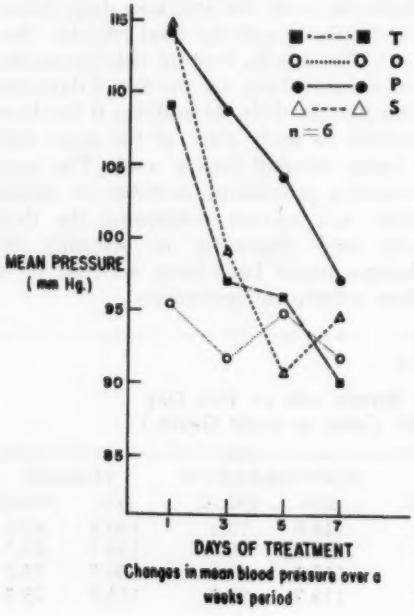
In Table 1 and Figure 1 are provided the mean values of blood pressure recording made initially and on alternate days during the first week of medication. Analyses of variance of the systolic and diastolic pressure values over this interval indicates that, for both indices, the time changes were larger than chance, and that the diastolic readings showed an interaction with the drug being administered. The reserpine group showed the most rapid drop in mean blood pressure.

TABLE 2

MEAN NUMBER OF PIECES PLACED OR ASSEMBLED ON THE PURDUE PEGBOARD BY CASES IN THE RESERPINE AND PLACEBO GROUPS PRIOR TO MEDICATION AND AFTER A MONTH'S TREATMENT. (FIVE CASES IN EACH GROUP.)

	RESERPINE		*PLACEBO*	
Time	*RLB*	*Assembly*	*RLB*	*Assembly*
Initial	133.8	17.8	168.0	21.1
1st Week	180.6	19.0	182.4	25.8
4th Week	180.6	17.7	175.2	27.2

FIG. 1



PSYCHOMOTOR PERFORMANCE

Support for some systemic effect of the tranquilizing drug at the chosen level also comes from the performance of the reserpine group on the Purdue Pegboard. It was previously noted that this group failed to show the expected increase in proficiency over a week's interval on the assembling sub-test in which several small pieces must be put together in a prescribed order. The

FIG. 2

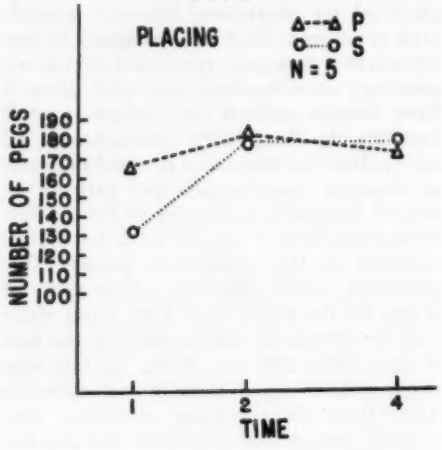
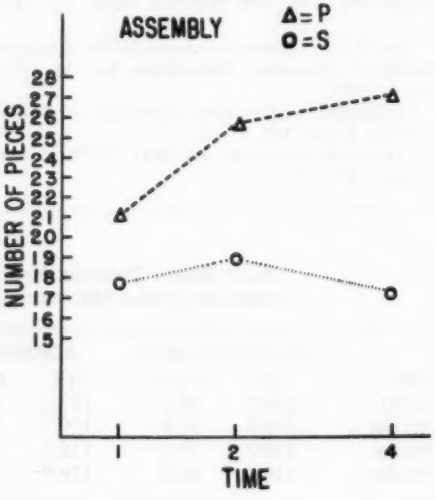


FIG. 3



reserpine group shows normal performance on a simple placing test based on the right hand, left hand, and two handed performance combined (RLB) but fails to improve on the assembly task even over the period of a month's time (Table 2, Figures 2 and 3).

TABLE 3

MEAN NUMBER OF ADVERSE BEHAVIORAL ITEMS NOTED BY THE NURSING STAFF ON A STANDARD CHECKLIST FOR EACH OF THE TREATMENT GROUPS DURING THREE WEEKS OF MEDICATION. (SEVEN CASES IN EACH GROUP.)

Interval (days)	*Chlorpromazine*	*Reserpine*	*Powdered Opium*	*Placebo*
1-3	72.4	63.1	82.4	71.4
4-6	68.6	50.2	75.1	64.9
7-9	44.6	33.9	47.4	54.9
10-12	33.9	26.4	30.7	50.0
13-15	30.4	27.3	30.0	45.6
16-18	28.9	24.4	23.3	27.9
19-21	25.6	28.7	21.6	45.7

TABLE 4

MEAN NUMBER OF ANXIETY ITEMS CHECKED BY THE PSYCHIATRIC RESIDENT FOR EACH TREATMENT GROUP INITIALLY AND AFTER A WEEK OF MEDICATION

Time	*Reserpine*	*Powdered Opium*	*Placebo*
Initial	7.0	8.2	6.0
1st Week	4.3	5.7	3.5

STAFF RATINGS

Over a week's time the observations of the nursing staff as recorded on a checklist (Figure 4) that they completed 3 times a day were previously found to show consistent improvement for all groups but no special interaction with the specific medication was found. There was some suggestion that the drug condition was beginning to show some advantage at the end of this period, however, warranting continued observation. Table 3 and Figure 5 show comparable findings for a 3-week period of observation. Again it can be seen that the groups all show a consistent and gratifying decrease in psychiatrically adverse behavior but no one group shows any special change either in magnitude or rate of change. The same general findings were obtained on the mental status and anxiety ratings made by the psychiatric staff in charge of these cases. Figure 6 shows the anxiety rating sheet used by the psychiatric residents. Table 4 and Figure 7 summarize the number of items rated prior to and after a week of treatment. No drug effect was found to be significant.

PERSONALITY TEST FINDINGS

The difficulties in administering the personality test at the start of the treatment to the more disturbed cases assigned to the project have made it necessary to limit the report to a small group of cases given reserpine and a corresponding group given the inert placebo. Table 5 shows the mean scores on each of the scales in the basic MMPI profile and the ego strength scale devised by Barron(2). Contrary to a number of studies on the changes on the MMPI

TABLE 5

MEAN SCORES ON THE MMPI FOR RESERPINE AND PLACEBO GROUPS PRIOR TO MEDICATION AND AFTER ONE WEEK OF TREATMENT. (10 CASES EACH GROUP.)

Group	*Scales*													
Reserpine:	*L*	*F*	*K*	*Hs*	*D*	*Hy*	*Pd*	*Mf*	*Pa*	*Pt*	*Sc*	*Ma*	*Si*	*Es*
Initial	54	63	54	67	78	73	69	49	67	71	73	56	59	26
1 week	57	74	50	69	73	71	73	55	80	73	80	62	59	38
Placebo:														
Initial	56	59	54	65	76	67	59	55	61	68	66	55	55	17
1 week	54	62	56	65	76	71	62	55	64	71	69	54	59	19

on retesting as reported by Windle(3), the cases in this study show a rise in pathological scores rather than the expected decline. The reserpine group showed the largest absolute shifts but the differences achieved statistical stability only for the hysteria and paranoia scales. The ego strength scale showed changes in the direction of greater readiness for psychotherapy for both groups, the reserpine group showing a statistically reliable advantage over the placebo group. These findings seem to show that there is a shift from regressive disintegration towards a restitutional effort characterized by externalization and by defenses of a more synthetic order.

FIG. 4

Project No._____ Patient_____

Observer_____ Date_____Shift_____

A NEW CHECKLIST OF BEHAVIORAL OBSERVATIONS BY PSYCHIATRIC NURSES

Complete this form on each patient in the study for each shift. Place a (+) opposite each item characteristic of the patient during the period of observation. Place a (++) opposite each item which is present in extreme degree. Note in the routine nursing notes in the chart specific instances of the behavior checked in this list.

BEHAVIOR AND MANNERISMS:
_____posturing
_____bodily rigidity
_____talkative and voluble
_____perspiring excessively
_____grimacing
_____incoherent in conversation
_____hallucinating or appears to be
_____talking to himself
_____bewildered and perplexed
_____restless and fidgeting
_____tremors
_____mute
_____circumstantial in conversation
_____tics
_____masturbating
_____untidy
_____picking and rubbing body parts
_____incontinent
_____pacing floor
_____hyperactive

MOOD:
_____apathetic
_____sulking
_____euphoric
_____irritable
_____depressed
_____anxious
_____brooding and preoccupied
_____hostile
_____calm
_____cheerful
_____pleasant
_____spontaneous

CONTROL:
_____performs many irrational acts
_____loud and noisy
_____swearing and cursing
_____destructive
_____assaultive or combative
_____impulsive

MENTAL CONTENT:
_____feelings of guilt
_____feelings of unworthiness
_____feelings of influence
_____apprehensive
_____fear of loss of control
_____physical complaints
_____talking of suicide
_____disoriented
_____confused
_____delusions

RELATIONS WITH STAFF:
_____resentful of staff requests
_____tube feeding required
_____poor self care
_____suspicious and distrusting
_____negativistic and resistent
_____demanding
_____complains about ward and routin
_____over -submissive to suggestions
_____misidentifies personnel
_____threatening to personnel
_____friendly and responsive
_____quiet but responds on approach

RELATIONS WITH PATIENTS:
_____socially incommunicative
_____usually alone
_____bullying others
_____dominating
_____seeks contacts freely
_____insecure
_____actively participates with group

Pertinent comments:
Received EST_____
Seventh day of Medication_____
Refused medication at_____
Other sedation given_____
Sleeping pattern_____
Seclusion necessary_____
Other_____

FIG. 5

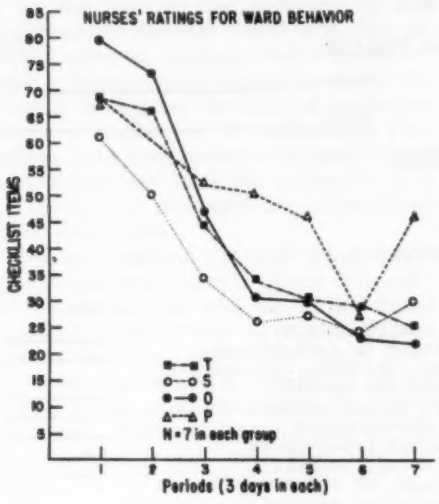


FIG. 8

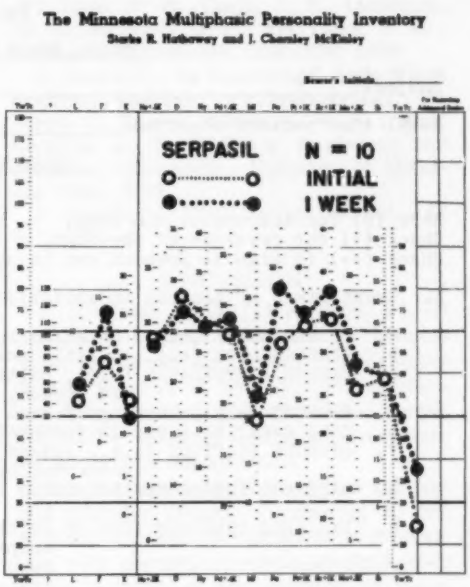


FIG. 7

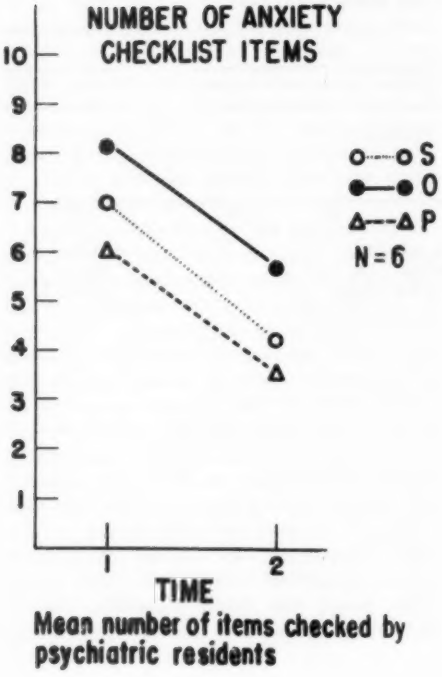


FIG. 9

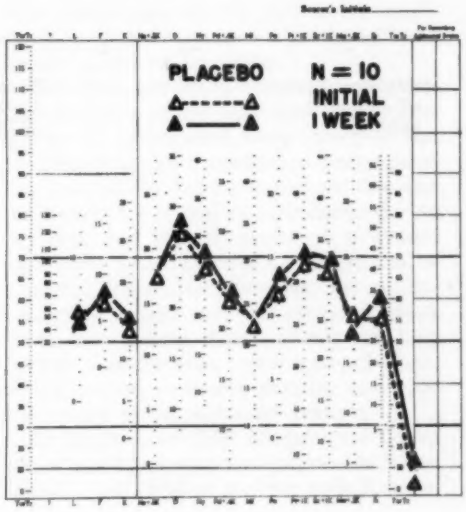


FIG. 6

Rating Scale of Anxiety

Subject:_____ Rater:_____

Total time patient observed:_____ Date:_____

INSTRUCTIONS

Mark (0) for absence of the sign.
Check (+) for presence of the sign.
Check (++) if sign is present and is severe.

1. Overt signs of tension or anxiety:

a. RESTLESSNESS (e.g., shifting in chair, fidgety) _____
b. IRRITABILITY (e.g., hostile reaction to frustration _____
c. SPEECH DISTURBANCE (e.g., halting, blocking, pressure of speech, excited speech) _____
d. TREMORS (e.g., shaking of hand or facial muscles _____
e. COLD SWEATING HANDS OR FOREHEAD PERSPIRATION _____
f. STARTLE REACTION (e.g., sudden motor reaction to incidental or abrupt stimuli) _____
g. HAND AND FINGER MANIPULATIONS (e.g., of objects, wringing of hands) _____
h. IMPAIRED CONCENTRATION OR ATTENTION (e.g., failure to comprehend simple statements, asks interviewer to repeat statements, preoccupied) _____
i. MOTOR AWKWARDNESS (e.g., fumbling of objects, bumps into objects) _____
j. HYPERSENSITIVENESS (e.g., overreaction to slight stimulation, to slight verbal criticism) _____
k. OTHER_____ _____
_____ _____
_____ _____

2. General estimate of degree of overt anxiety.

-3	-2	-1	0	+1	+2	+3
(Extreme lack of concern apathy)			(Normal adult individual in this situation)			(Overt panic state)

Discussion

In the light of the physiological and psychomotor changes noted with the administration of reserpine and chlorpromazine it does not seem possible to discuss the clinical findings on the basis of ineffective levels of medication. No undesirable side-effects have been noted with this level of medication, nor have the patients in any of the groups expressed any dependence upon medication.

We have retained our usual psychotherapeutic endeavors when a patient is in need of a sedative including the usual "milieu therapy" which obtains on our psychiatric wards. In other words, the drugs have been introduced into a therapeutic setting which is not constricted because of their exhibition. Besides inert placebo, an active placebo is also introduced into the design for the following reasons: if on a particular psychiatric unit some patients are placed on placebo and other patients on the active drug, the doctors and nurses may pick up cues sufficient to indicate an active drug rather than an inert placebo. The patient may also pick up some change in his internal milieu which he communicates to his attendants. Through suggestion, a relatively non-specific effect can be amplified by the expectant attitudes and feelings of those in the therapeutic team. It enhances the efficacy of the design if these tranquilizing drugs are also compared with an active placebo which simulates some of the sedative effects.

Tested in this way in this psychiatric setting, the drugs used do not yield any more rapid therapeutic gains, or more desirable patterns of mental, emotional or behavioral changes than those achieved by existing treatment procedures. Our continued evaluation of these tranquilizing drugs in the management of acute mental disturbance on our inpatient service in an atmosphere which avoids irrational enthusiasm as much as unreasonable insistence on drugless healing thus reaches the sombre conclusion that there is improvement in all groups with no special interaction with the specific medication to be found; although there are some other details not directly related to immediate clinical improvement.

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DISCUSSION

T. R. Robie, M.D. (Orange, N. J.).—It is research such as this study by Doctors Abse, Dahlstrom and Tolley which makes science what it is, namely, the relentless search for the truth. We should feel deeply indebted to them for calling these astonishing findings to our attention.

Since my own astonishment over the fact that placebo therapy (according to the authors) was equally efficacious in comparison with chemotherapeutic agents known to be sedative or tranquilizing to many thousands of patients, according to the published reports of hundreds of investigators, and in my own experience, I was intrigued with the prospect of discovering if possible what the artefact is in this report. I have leaned heavily upon our colleagues who were intimately associated with the early research on reserpine and chlorpromazine. The comments will be a distillate of many short discussions of this sort and a single most significant reference to Nathan Kline's earliest paper on reserpine.

This short period of observation thwarts the recording of the very best results that are to be anticipated from reserpine—for all those who have conducted research on this tranquilizer have pointed out that one must expect a period of turbulence during the first and second weeks of treatment *before* the real tranquilizing effects can be expected. Thereafter, however, the continued good effects may be expected. Also, those who follow their patients for long periods describe even better tranquil effects in the second to fourth months, and even for longer more sustained periods.

As far back as 1933 Chopra and Gapta noted that it was common practice in Bihar, India, to put children to sleep with Rauwol-

fia. It was called "pagla-ka-dacra" meaning "insanity herb" at the bazaars where it was sold. These authors then commented "on account of its cerebral depressant properties, the alkaloid should prove to be a valuable sedative drug." Their prediction was amply verified by the great flood of unscientific papers sparked by those of Kline, Crane, Sainz, Barsa and many others which filled our psychiatric journals and the *Saturday Evening Post* from 1954 on.

We had never before possessed a drug capable of calming schizophrenia as did this remarkable snake root alkaloid, or of reducing hypertensive blood pressure to normotensive levels.

Very soon thereafter chlorpromazine, a drug synthesized in France, was found to possess almost identical therapeutic effectiveness. Certainly it is common knowledge that these two drugs *are* effective in sedating psychotic disorders and that they do have hypotensive properties when used in effective dosage. Therefore, it would seem unlikely that many psychiatrists will be dissuaded from using these tranquilizing chemicals by this report that seems to show that a placebo has equally effective tranquilizing properties.

Thus one is confronted with the question: Where is the artefact in the study presented by Drs. Abse, Dahlstrom and Tolley? It is my belief that the artefact is the surprisingly short period of observation—one week only.

In Nathan Kline's objective studies reported in 1954, 4 physicians and 4 nurses took blood pressures on all patients in a ward on 4 separate occasions one month apart. First values were obtained immediately pretest and the last immediate post test, and patient behavior was recorded by ward personnel from the end of the first month on.

It was learned from these studies on ward psychiatric patients that significant blood pressure recession occurred in response to Serpasil, namely: from 127/76 down to 118/68 (mean blood pressure) Raudixin down to 117/68. The recession caused by placebo was less in these longer observed cases than found in Abse's study, *i.e.* from 127/76 down to 121/74—only 6 points in contrast to the 22 points lower in Abse's study.

The only satisfactory explanation suggested for the significant drop in blood pressure demonstrated in the placebo treated cases, is the effect of "total push," namely the increased attention given to all patients, placebo cases included, by nurses' observations, extensive psychological testing, *etc.* plus the administration of a supposed specific medication. One must admit it is difficult to see why such a drop as 22 points occurred; therefore, we must ask, would these same findings show up one month or two months or four months later on the same regime?

It is reasonable to suppose that more consistent tranquilization would be found in those receiving specific therapy for the longer period.

REPLY

D. W. Abse, M.D.—Dr. Robie's chief criticism of our report is the short period of observation. It should be clear from the findings reported that some of our parameters extend over a three week period. We are also engaged in work in a state hospital setting which will enable us to extend our period of rigorous observation very considerably. Even so, the point we wish to make is that in acute disturbances our findings suggest that the inert placebo as well as the standard sedative lead to effective tranquilizaton, not distinguishable from the action of the tranquilizers. Dr. Robie indicates that there is a delayed action in terms of the tranquilization from reserpine. If this is so, our work indicates that there is no need to give the drug in so far as tranquilization within three weeks is concerned. However, there may be other reasons for doing so, hinted at in our mention of findings not related immediately to clinical improvement, which we hope to understand in the course of our future work.

MEDICO-LEGAL ASPECTS OF POST-TRAUMATIC EPILEPSY

IRWIN N. PERR, M.D.[1]

It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts. —Sherlock Holmes

Courts are often called upon to render decisions based on the relation between injury and disease. That the type of testimony allowed in courts is often distorted and twisted is apparent to many physicians. Although certain problems may be quite common to many cases, each court presentation remains an entity unto itself; of this, Dean Pound(35) has stated,

The conditions of today call for planned and orderly cooperation of the lawyer and man of science in doing systematically for types of questions what has been done unsystematically and often blunderingly for each case as it arose.

Post-traumatic epilepsy occupies a rather unique place in the field of legal medicine in that it is one of the few diseases that develops long after the related injury. Therefore the probability or improbability of such a complication is a very important medicolegal consideration. Previous articles (2, 10, 11, 14, 32, 33, 43) have commented on various general aspects of the relation between epilepsy and the law. This paper covers the following questions: 1. What is the relation between injury and epilepsy? 2. How is post-traumatic epilepsy recognized and differentiated from other types of epilepsy and other illnesses? 3. What are some of the features of the course of post-traumatic epilepsy? and 4. How does one estimate the likelihood of post-traumatic epilepsy developing following a head injury? Although answers to these questions are not clearcut, there is much information available on which to base a reasonably expert opinion.

Probably in no other field of medicine is the position of the expert medical witness more difficult than in testifying in cases dealing with head injury. Between limitations of medical knowledge and vaguely defined clinical entities on the one hand and the avid partisanship in the courts on the other, the physician finds that being an "expert" is no easy task. Referring to this problem, Hamby(17) states,

When (a) mishap finally occurs, the patient often finds himself obliged to seek legal aid and to obtain the financial coverage he had so fondly imagined earlier was his by right of purchase, of employment, or by virtue of citizenship in the modern state. He now suddenly plunges into a bewildering pool, the currents of which he only vaguely may have suspected earlier. To stay in business, his insurers attempt to minimize his complaints and thereby his compensation. To counteract this tendency, his lawyers inflate the estimate of his damage. Members of the jury bend toward fat or lean settlements according to their generosity with other people's money, or to their cynicism. The doctor's dilemma lies in giving testimony based on medical fact in the midst of frank and frantic partisanship.

Thus one encounters this representative statement by a very prominent plaintiff's attorney, Belli(4).

Traumatic epilepsy may not show itself for as much as 18 years after the damage to the brain. One time the author (Belli) was presented with a case of a 3-month-old child that had been placed in a hospital for surgery on a cleft palate. The day after the operation, unaccountably, the child was seen in its bed with a stellate(star) skull fracture. The recovery was uneventful. A year later the most complete examination revealed not a sign of brain damage. Should settlement be postponed for some 21 years until majority is reached, when there would probably be no chance of sequela (although there have been cases that manifested themselves years later)?

This specific example will be discussed below to illustrate the probabilities involved in such cases.

Another aspect of this problem, most important to the examining physician, is that reported by Hyslop(18) who studied 750 head injury cases involving litigation. Of these, 65(8.6%) raised the possibility of

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post-traumatic epilepsy. In 13(20%), he found focal brain damage and verified seizures. In 2 cases, the seizures occurred in the first 6 days following injury, with no further attacks (so that a diagnosis of "epilepsy" would not be justified). The other 11 cases all developed within 26 months following the injury. The remaining 52 cases were evaluated quite carefully; all claimed a head injury of at least a concussional nature. In 12 cases, investigation revealed no injury at all; in 3 cases there had been merely a laceration of the scalp, with careful coaching by the claimant's lawyers to bring in the question of epilepsy. In 18 cases the injury occurred as the result of a seizure; of these, 7 admitted previous attacks and 5 others were later shown to have had previous epilepsy (which had been diagnosed prior to the alleged injury). Six cases were those in which the individual had developed idiopathic epilepsy without an antecedent injury. Four had had previous head injuries which at first had been denied. In not one of the cases of focal brain injury was there an attempted fraud; of the other 52, 28 (54%) showed malingering or fraud with respect to the character of the injury or its effects. Thus the number of frankly fraudulent cases outnumbered the true cases of post-traumatic epilepsy by more than two to one. No similar studies have been found, but this report brings clearly into focus one of the chief difficulties facing the examining physician.

There have been many legal cases in which post-traumatic epilepsy was a prime consideration. Unfortunately, the medical data contained in the official legal records are too sparse to allow comment. Some aspects of these cases will be illustrated below. The various questions raised are most important and stress the fact that adequate evaluation is essential inasmuch as epilepsy is a disabling disease with great social handicaps to those so labeled and it is considered by laymen to be a most revolting disease so that compensatory awards tend to be high.

In Kuemmel v. Vradenburg(57), the claimant had a depressed skull fracture requiring surgery in order to remove bone and dirt from the brain, with resultant neurologic damage. The medical expert testified that the patient was likely to have a spastic paralysis and that such injuries are "likely to cause people to have convulsions or epileptic fits." In a New York case(55), the plaintiff was hit by a falling rock at a state park, sustaining a deep penetrating fracture of the skull. One of the resulting complications was post-traumatic epilepsy which was a factor in the final award of $72,867.28. In Nagala v. Warsing(59), a boy, 3 years, 10 months old, had a compound skull fracture, with much brain damage, and unconsciousness of 13 day's duration. In this case, no specialist in a neurological field testified, but there was clearcut evidence of poor coordination on the right side and ocular difficulties. Among the elements considered in reaching an award were the possible development of personality problems and epilepsy.

A common situation is that where epilepsy develops and the patient claims that is was the result of an antecedent injury. In Cochran v. Wimmer(54), a claimant attributed the onset of epilepsy to an alleged injury 4 days earlier. There was no external evidence of a physical injury. The court ruled that the problem was the determination of whether this was traumatic or idiopathic epilepsy, and thus that this was a question of fact to be decided by the jury. In Bartholomew v. Impastato (53), the court ruled that opinions voiced by two physicians, as to mental injuries which might result from cerebral injuries sustained by a 3-year-old child due to fault, were too speculative to warrant an award of damages based on the conclusion that the injuries were permanent.

The predictability of the future development of epilepsy is most important in the granting of an award. In Thompson v. Anderman(60) a boy of 13 with the mentality of a 10-year-old had a basal skull fracture, contusion of the brain stem, and hemorrhage from the left ear. Taking into account his age, life expectancy, as well as the possibility of epilepsy developing, an award of $54,000 was granted. All 3 doctors agreed on a possibility of epilepsy, but did not feel that it was likely in view of the fact that more than 3 years had passed since the injury, one expert stating, "We are always

leery about a seizure developing 3 years after the injury." In another case(56), there was an award of $15,000 for a skull fracture and lacerations sustained by a 6-year-old "who would probably suffer in later years from convulsive disorder." Bony fragments were removed from the brain, and a small metal disc inserted in the skull. The EEG suggested a focal convulsive disorder in the left temporal area "probably with some grand mal component." Testimony stated that, "during the war 50-75% of those receiving such wounds developed convulsive disorder" and that "75% of those with an abnormality like that of appellee (the claimant), resulting from injury, will sometime develop focal epilepsy."

An interesting case was that of Melendez v. N.Y.C. Omnibus Corp.(58) where a 46-year-old cook, alighting from a bus, suffered a skull fracture with traumatic epilepsy, post-traumatic psychosis, right-sided paralysis, and aphasia. The court reduced the award when it was shown that the plaintiff had not worked for 23 months prior to the injury and that he had a history of psychoneurosis for which he had previously been discharged from the army.

These illustrations point out some of the problems which arise in courts concerning post-traumatic epilepsy.

FREQUENCY OF POST-TRAUMATIC EPILEPSY AS COMPARED WITH OTHER TYPES OF EPILEPSY

When epilepsy develops, the type and cause must be ascertained, inasmuch as post-traumatic epilepsy is compensable in contrast to idiopathic epilepsy and other types which are not. Statistically, post-traumatic epilepsy is a relatively insignificant type of epilepsy. Idiopathic epilepsy constitutes about 78% of epilepsy while post-traumatic epilepsy occurs in about 3 to 5% of cases. Thus idiopathic epilepsy is found 15 to 20 times more commonly. Table 1 illustrates this incidence in two studies.

Another large report from the Montreal Neurological Institute(19) showed that in 2,000 cases of epilepsy, only 86(4.3%) were post-traumatic in origin. Thus, when a case of epilepsy is presented, all causative factors must be evaluated. The discovery of a brain tumor in an alleged post-traumatic case may be life-saving.

TABLE 1

RECURRENT CONVULSIVE SEIZURES IN 2,000 NON-INSTITUTIONALIZED CASES OF EPILEPSY AT ALL AGES

Presumed causes of seizures	*After Lennox*[88]
Non-demonstrated	77.6%
Cerebral Trauma	5.7
Birth Injury or Congenital Defect	5.6
Brain Infection	4.2
Brain Tumor	2.6
Cerebral Circulatory Defect	1.9
Extracerebral Causes	0.9

ANALYSIS OF 689 PATIENTS WHOSE ATTACKS BEGAN AFTER 20 YEARS OF AGE

	After Livingston[83]
Idiopathic Epilepsy	77.2%
Hypertension or Cerebral Arteriosclerotic	12.1
Alcohol	4.1
Post-traumatic	2.5
Neurosyphilis	1.6
Pregnancy	1.2
Cerebral Birth Trauma	0.6
Brain Abscess	0.3
Brain Tumor	0.3
Cysticercosis	0.1

SOME PATHOLOGIC FACTORS

Epilepsy is a disease of the brain ; therefore, in order that post-traumatic epilepsy develop there must be an injury to the brain. "Laceration of the brain is an essential factor—whether or not there is injury to the skull"(8). Injury to the brain can occur indirectly as in a contre coup injury whereby the tips of the temporal poles are traumatized by transmission of the force of the blow or injury may result directly from trauma in the area of the blow. There may be damage from a closed head injury in which there is no depression of bone in which case the injury may be a scalp laceration, concussion, or even a non-depressed fracture. On the other hand, there may be a compound fracture with penetration of the dura matter with direct and obvious injury to the brain. The distinction between these two types of injury must be kept in mind in evaluating this problem as the likelihood of a subsequent epilepsy correlates to a great extent with the type of injury. Thus scalp injuries

or lesser skull injuries may be merely incidental. In addition, factors such as extracerebral bleeding may not be related to the problem of epilepsy so that hematoma *per se* without cerebral damage would not be a likely causative factor. Analysis of type of injury will be elaborated below.

INCIDENCE OF POST-TRAUMATIC EPILEPSY FOLLOWING HEAD INJURY

Analysis of reported statistics must be based on many distinctions, the two most important of which are (a) war reports versus civilian studies and (b) closed injuries as opposed to penetrating injuries. Because of numerous variables, few studies are comparable and each report must be analyzed in its individual context. For example, based on published reports, one can state that the incidence of epilepsy following head injury is 0.1% to 50%. Obviously the quoting of any particular number conveys little; some reports even indicate that the likelihood of epilepsy following head injury is less likely than in the absence of any injury.

Even wartime studies, despite the fact that they are the most common source of statistics, contain much conflicting material. Numerous studies based on the experience in World War I and World War II are available from many countries. The range of incidence here was 1.5% to 49% (compared to the incidence in the population at large of 0.5%). The British Ministry of Pensions reported an incidence of 800 epileptics (4.5%) in 18,000 gunshot wounds of the head. Though several studies are in the general range of 2 to 7%, others report 12.1% (a French report), 44% (a German study of 562 cases), 27%, 49.5% (of 1,234 cases), 45%, and 43% (of 820 cases). The basic question, of course, pertains to the group being reported inasmuch as this is apparently the source of much confusion. In contrast to the above figures is the largest single study(12) reported of the civilian population of Switzerland in a 14 year period from 1919 to 1933. Here there were only 50 cases of traumatic epilepsy in 47,130 head injuries, an incidence of 0.12% or less than that of the general population.

Why is it then, that the war studies report high figures in comparison to studies of civil injuries? Let us look at a well-known study, that of Ascroft(1). In 1939 he reported on 317 cases from World War I; of these, 34% had seizures. In cases where there was penetration of the dura matter, the incidence was 45%; when there was no penetration, the incidence was 23%. There are several factors for this relatively high "incidence." First, a number of persons were included who had seizures immediately following the injury (even if only one seizure) without recurrence. Secondly, many cases were excluded because of insufficient data, and this would apparently contain more cases who did not develop epilepsy. Thirdly, many minor injuries were not included; neither were cases where the damage was to the cerebellar area of the brain. The group in general was one in which the members were severely injured. A fourth very important factor was that these injuries were caused by high velocity missiles, which caused great brain damage in contrast to usual civilian injury by a blunt instrument at considerably lower velocities.

The differences between war and civil injuries have been commented on by many. Siris(41) reports,

> Among the ways (in) which head injuries of war differ from those of civil life is the incidence of subsequent epilepsy. . . . The development of this condition following all types of civil head wounds is considerably lower, running in general between 0.5 and 2 per cent, not much higher than the incidence of epilepsy in the population at large.

Sachs(40), noting the difference between missile and blunt injuries in the causation of epilepsy, comments,

> It is very striking that the incidence of epilepsy following fractures of the skull in civil life is far less frequent than in war wounds, and, of course, one obvious difference is that in the war cases, compound fractures are much more common.

Basically much can be summed up by this statement(15),

> Suffice it to say that the highest incidence claimed is 20% and the lowest a good deal less than that in the general population; and that it is at least very probable that the first figure relates to a selected group of severe head in-

juries and the second is diluted with many trivial cases.

Further surveying of reports reflects the variance in reported incidence. In one war study(24) of 200 cases of severe brain injury, caused by penetration of the dura mater by artillery shell fragments and rifle bullets, the incidence of epilepsy was 16.5% (33 cases). One English study(44) showed a less than 2% incidence where the dura was not penetrated, compared with a 27% incidence where there was penetration with brain damage, while another English report(37) of 820 cases of penetrating brain wounds reported an incidence of 43%. However, here again one runs into the custom of classifying as an epileptic the veteran who had but one seizure. Two German reports(3, 7) report incidences of 44% and 49.5% while in 279 American cases(51) the incidence was 36.2%.

Seizures following lobotomy (a direct injury to the brain) occur in 25.6%; 60% of these are controlled by medication(13). Bickers(5) reports the incidence in open head injuries as 5.5 to 20% and in closed head injuries as 2.5% with seizures after simple concussion almost unknown.

Most reports concerning closed head injuries give an incidence of 2 to 6%(34). Military reports indicate a higher incidence, but here again one sees the results of high velocity missiles causing injury as well as the apparent inclusion of only the more severely injured. In general, reports from civilian studies indicate an incidence less than one-third the rate of that in military reports.

A very important study is that of Penfield and Shaver(31), a summary of which is shown in Table 2. Most important was the finding that in 126 brain concussions there were no cases of post-traumatic epilepsy —a finding which has been supported elsewhere. In 407 head injuries, the total incidence was less than 2.5% (11 cases).

The larger the series of cases, the lower the incidence reported; the largest series ever reported being that of Feinberg(12) where the incidence was 0.12% in over 47,000 cases. Of these, Denny-Brown(8) says,

> The series of Feinberg is therefore by far the largest unselected group of civil head injury, and the best figure we have at present for such a group.

In that series, the rate of epilepsy was 5 per 1,000 with fractures (0.5% or the same as that in the general population).

TABLE 2

INCIDENCE OF POST-TRAUMATIC EPILEPSY FOLLOWING VARIOUS TYPES OF HEAD INJURY

(after Penfield and Shaver)

Type	*Total Cases*	*Epilepsy Number*	*Epilepsy %*
Scalp wounds without fracture	193	1	0.5
Concussion, contusion, or compression above	40	0	0
Fracture without proven dural tear (including subarachnoid hemorrhage)	136	7	5.1
Fracture with dural tear	38	3	7.9

THE RELATIONSHIP OF FRACTURE, HEMORRHAGE, AND OTHER RELATED INJURIES

A pertinent question is "what is the likelihood of epilepsy following a skull fracture with no depression?" Denny-Brown(9) states,

> It may be noted . . . how clearly the figures show that fracture of the skull is without importance in the question of epilepsy.

Penfield(28) comments,

> Closed injury to the skull, regardless of its severity, rarely results in post-traumatic epilepsy. . . . The likelihood of epilepsy is greatly increased in case the dura has been penetrated and the brain lacerated by fragments of depressed bone or missile. This is apparently quite independent of the severity of the cerebral concussion and intracranial hemorrhage which may have attended the injury.

Epilepsy is rarely found after subdural hematoma, meningitis, thrombophlebitis, thrombosis, *etc.*

Penfield(27) further states,

> Brain laceration more often causes seizures than cerebral contusion or closure of a cerebral vessel. Subdural hematoma and internal hydrocephalus never do unless some other local complication is present.

These factors can be summed up in this statement by Denny-Brown(9):

Depression of an area of bone in the cranial vault is not necessarily a severe or dangerous happening. . . . The important feature is whether or not the dural lining of the skull is torn by a sharp edge of bone jutting inwards . . . a simple fissure in the vault of the skull is not of itself harmful. . . . The cases of war injury demonstrate that fracture *per se* is not of any real moment in this question. . . . It must be remembered that the cause of epilepsy is damage to the brain.

THE MEANING OF A CONVULSION SOON AFTER INJURY

An essential element of epilepsy is its recurrent or periodic nature(32). Since there are many other causes of convulsions, this element must be found in addition to other characteristics of epilepsy. An epileptiform attack immediately following an injury does not necessarily denote epilepsy.

Denny-Brown(8) states,

It should be at least considered whether early convulsions deserve the name traumatic epilepsy or should the term "immediate traumatic epilepsy" be given some special annotation. There are cases where the diagnosis of epilepsy was made on a single convulsion in the early stage of severe head injury, without subsequent disability, and where diagnosis interfered with subsequent employment. . . . Because a drug, or electric shock, or anoxia, will provoke a convulsion, it cannot be maintained that "epilepsy" is thereby produced.

Thus convulsions immediately following the injury may indicate only a temporary response to an injury. As such, they usually disappear. In contrast, the basic pathology behind post-traumatic epilepsy is scar formation which usually takes months to develop.

This is confirmed in many reports. Marsh(26) states that not every case of convulsive disorder which follows an injury to the head is necessarily a bona fide case of post-traumatic epilepsy. Cavins(6) comments that Ascroft's investigation appears to show that fits which occur in the first two weeks after injury and operation do not predispose to epilepsy at a later date and that this is in agreement with the experiences of patients who have seizures in the first days after subarachnoid hemorrhage or after the removal of brain tumors. Penfield in discussing Watson's paper(51) remarks,

In Ascroft's figures of 45% of epilepsy after injury, he included the patients who had seizures during the first two or three weeks after brain injury. But only 20% of those patients will become chronic epileptics who have recurring seizures. The percentage is thus too high.

Walker has done much work on the subject of post-traumatic epilepsy(36, 45, 46, 47, 48, 49, 50). He states(45) :

Paroxysmal alterations in the state of consciousness very commonly follow a head injury. Even shortly after a blow producing only a momentary loss of consciousness, the victim is likely to feel dizzy and light-headed and to black out when he assumes an erect position. These minor lapses are generally considered as due to nervous instability producing a temporary ischemia.

He further remarks(48) :

Some members of the legal profession . . . imply that a few dizzy spells or momentary blackouts after a head injury and an abnormal electroencephalographic finding are sufficient to establish the diagnosis of epilepsy, with all the stigmas attached to the "falling sickness," and who, on this basis, ask a large award to compensate their "epileptic" clients for the recurrent seizures that will mar his or her future. Such a contention is obviously false since neither these clinical manifestations nor abnormal brain waves are adequate for the diagnosis of a convulsive disorder *per se*.

HEREDITY AND THE DEVELOPMENT OF POST-TRAUMATIC EPILEPSY

Some authorities feel that predisposed individuals are more likely to develop post-traumatic epilepsy, and that constitutional factors exclusive of the injury should be considered as a causative factor. Other studies deny the validity of this concept. For instance, one study(36) reports that families of post-traumatic epileptics show a 4.5% incidence of seizures compared with 3.4% in normals and 17% in families of all epileptics. That there is a familial disposition in idiopathic epileptics is well verified, as is shown above. Slater(42) states,

Some degree of inherent susceptibility may be present in persons who suffer "traumatic" epilepsy.

Walker(47) and Siris(41) have discussed this theory. Expressing a contrary view, Phillips(34) states,

> There is no reason to suppose that the subject of cranial trauma is more likely to suffer a fit if he has a . . . family history of epilepsy.

Others(26, 51) agree with this viewpoint. Thus, at present, there are conflicting views on this subject.

TIME INTERVAL BETWEEN THE INJURY AND THE DEVELOPMENT OF POST-TRAUMATIC EPILEPSY

This subject is of extreme medicolegal importance as the incidence of epilepsy is closely related to the time interval following the injury. Where there has been an injury, a lapse of time, and no development of epilepsy, the reasonable or probable likelihood of such a complication is an important consideration in the assessment of damages. The lawyer, in such a case, must show that there is a 51% chance of such a complication or that such a complication is more likely than not. The claimant's attorney, in order to stress the possibility of such a sequel, may quote a few cases in which epilepsy developed following an injury 15 or 20 years earlier.

Actually, cases in which epilepsy develops many years after an injury are relatively rare. Mann(25) reports one case with a 24-year interval between injury and onset of seizures. In his paper of 1949, he reports finding only 5 cases where the epilepsy developed subsequent to a 10 year period following the injury. His patient, a woman, had been kicked in the head by a horse at age 3 and suffered a depressed skull fracture which remained palpable through the years. There were focal EEG findings. After several years of various types of drug therapy, surgical extirpation cured the epilepsy and confirmed the diagnosis. Such cases are so rare as to be meaningless statistically, although their intriguing and dramatic qualities are not to be lost in the courtroom.

More important are the results in reported groups of cases. Phillips(34) reporting 190 cases of epilepsy after closed head injuries showed that 55% develop in 3 months, 82% in one year, 85% in 2 years, 97% in 4 years, and all by 11 years. In another series(8) where epilepsy developed in 53 of 630 head injuries, epilepsy occurred in one month in 42%, in 1 to 6 months in 30%, in 6 to 12 months in 14%, in 1 to 2 years in no cases, and in more than 2 years in 13%. In an Army series(36), 27% developed within 3 months and 58% by 6 months. Walker(45) also states that 50% develop within 9 months and, of those in whom epilepsy develops within 5 years, 80% have the initial seizure within 2 years. Jasper and Penfield(19) report an incidence of 46% in the first year, 63% in 3 years, and 80% in 5 years.

Thus, approximately 50 to 80% develop in the first year and about 55 to 85% by 2 years, with a probable figure of 75% for the 1½ to 2 year period. Thus, most often, post-traumatic epilepsy will be brought into trial proceedings as an existing complication, rather than as a potential one.

OTHER FACTORS CONCERNING TYPE OF INJURY

Injuries to the motor area will give the highest incidence of epilepsy; however, such injuries do not differ to any significant degree from trauma to the frontal and temporal areas. Injuries to the occipital area or the midbrain on the other hand are not characterized by epilepsy. Russell and Whitty(37, 38, 39), Ascroft(1), and others comment on this distribution. Whether or not the presence of pieces of bone or metal embedded in the brain play a pertinent role is another question. Apparently this factor is not especially relevant to the incidence of epilepsy, perhaps because large foreign bodies are usually removed surgically, and the ones that are left do not seem to be epileptogenic. Where there is infection of brain, the incidence is higher. Early surgery does not seem to lower the incidence. The incidence is higher where there is a prolonged period of post-traumatic amnesia (PTA). In one series(15) of 38 cases, there was a PTA of more than 3 hours in 28, under 3 hours in 8, and under one-half hour in two. Many cases show no unconsciousness with the absence of unconsciousness reported in 23 to 36%.

Inasmuch as the incidence is related closely to damage to the brain, one would

expect to find supporting evidence on neurologic examination. In a well studied series of Army cases(36), 94.3% showed neurologic damage with only 14 of 246 cases demonstrating no abnormality on neurological examination. On the other hand, the presence of severe head injury does not mean that epilepsy will develop. One study(16) mentions a head injury group, with no convulsions, that was characterized by greater injuries than the cases which developed post-traumatic epilepsy.

SOME FEATURES OF POST-TRAUMATIC EPILEPSY

Two features should be mentioned: 1. Often the course is quite mild, and 2. Often the condition disappears completely. In 207 cases(45, 48), less than one-half had more than 2 attacks of any type per year. In major attacks, only 30% had more than 2 seizures a year; and of the group studied, 47% had no attacks for 2 years, 35.6% had no attacks in the period from the fifth to the tenth year after the injury (this study was a 10 year followup), and 14.6% only 1 or 2 attacks a year in the last 5 years of the period. If in the first 5 years, seizures cease for a year, the chances are 4 out of 5 that there will be no seizures in the next 5 to 8 years. If there is a cessation of attacks for 2 years, the chance of recurrence is only 2 in 100. Probably 40% of those with seizures in the first few weeks will have no further seizures.

The greater the neurologic deficit, the greater the disability from such factors as post-traumatic psychosis or neurosis, and the lower the basic intelligence, the more likely is the individual to be handicapped in his future adjustment. These factors seem to play a greater role than the epilepsy or even paralysis alone.

POST-TRAUMATIC EPILEPSY AND THE EEG

The electroencephalograph is a very useful instrument in evaluating brain function. It is one factor in the diagnosis of any type of epilepsy. Pertinent here are the findings which support a diagnosis of post-traumatic epilepsy and which may help in the differentiation of this condition from other types. The question of the EEG as a help in prognosticating the likelihood of post-traumatic epilepsy is another urgent problem. Unfortunately, the EEG does not relate well to the pathological conditions under study. Various patterns of abnormality are common to many conditions, and considerable deviation occurs even in normal subjects. Penfield(30) states,

> We should agree immediately that dysrhythmia is not epilepsy and that, particularly in cases of compensation, we should be very loath to let dysrhythmia or alteration in the EEG record influence us very much. The patient who is an epileptic should be defined only as a patient who has recurring seizures.

Electroencephalographic findings following injury are of little prognostic significance. One encounters generalized and focal abnormalities, slow irregular and "spiky" focal discharges. Of the consistent slow wave focus on the EEG, Marsh(26) states that this does not prove that the patient has or will have post-traumatic epilepsy.

> It signifies a focus of abnormal cellular activity which, in the majority of cases of craniocerebral injury, even of the penetrating type, does not result in convulsive seizures.

Williams(52) states:

> An abnormal EEG persisting after a head injury does not necessarily increase the likelihood of traumatic epilepsy, but the presence of episodic outbursts of abnormal waves does. . . . Immediately after a head injury, it is usual to find some gross abnormality characteristic of severe cerebral damage during the period of resolution (which) may mimic the picture of epilepsy, but which in a few weeks subsides with gradual reappearance of normal rhythms.

As to the non-specific abnormality, he states that

> the presence of this kind of abnormality in patients with head injury does not seem to be closely related to the likelihood of traumatic epilepsy.

In his series, he found larval epileptic outbursts in only 9%, but that these were helpful in diagnosis as such findings occur 3 times more frequently than in idiopathic epilepsy. Paroxysmal outbursts alone were found about equally in post-traumatic epilepsy and in head injuries without the epilepsy.

Walker(45) states,

Some years ago it was hoped that the EEG would be of diagnostic and prognostic importance in epilepsy. Experience has shown, however, that the brain waves may denote cerebral damage but do not reliably indicate or forecast convulsive complications.

In similar studies, he reports(20, 21) that 88% showed some EEG abnormality with 78% showing focal abnormality.

In one study(19) of Jasper and Penfield, localized findings (either random spikes or sharp waves) were found in 90% of the post-traumatic epileptics. It was reported that it is

> questionable whether the diffuse or bisynchronous disorders are truly of post-traumatic etiology. . . . One may assume the probabilities are greatest that they are essential (idiopathic) rather than post-traumatic epilepsy.

In Gibbs' study(16), 92% of post-traumatic epileptics had abnormal records as compared with 47% with severe head injury, 85% in unselected epileptics, and 16% in normals.

The latter study by Gibbs, Wagner, and Gibbs(16) is a most important one in that it compared the EEG's of 125 cases of post-traumatic epilepsy, 215 cases of head injury without convulsions, 1,161 other epileptics, and 1,000 normal individuals. Interestingly the group of severe brain injuries without epilepsy had marked injury with all being unconscious at least an hour, 23% with brain laceration, 55% with bloody spinal fluid, 5% with depressed fracture, 21% with compound fracture, 8% subdural hemorrhage, and 2% extradural hemorrhage. The authors point out that EEG's done immediately after head injury are of little use, as at this time practically all patients demonstrate some findings and that as a result the EEG's in this study were done at least 3 months subsequent to the injury. Children were more likely to show an EEG abnormality. While in the post-traumatic series, the incidence of abnormalities remained almost constant; in the head injury group, it gradually declined over a 2 year period. Focal findings were 4 times as frequent in post-traumatic cases as in unselected epileptics, and focal paroxysmal findings were 21 times as common.

After cautioning about the danger inherent in generalization, the authors presented the following results.

1. Focal EEG abnormality is strongly suggestive of brain damage.

2. Other things being equal, if generalized abnormality is present 3 or more months after a mild head injury, the chances are 16 to 1 that the abnormality antedated the injury.

3. In post-traumatic cases, even though the EEG is normal, the brain may be damaged (found in 3 cases of 160, or less than 1 in 50).

4. If a paroxysmal abnormality is found 3 or more months after the injury, the chances are at least 27 to 2 that the patient has epilepsy.

5. If a patient has seizures and shows focal paroxysmal abnormality 3 or more months after head injury, the chances are 21 to 7 that he has the seizures as a result of the injury rather than as a result of the other known or unknown factors that produce seizures in an unselected group of epileptics.

6. If a normal EEG is found 3 or more months after the head injury, the chances are at least 53 to 8 that the patient is not a post-traumatic epileptic.

UTILIZATION OF MEDICAL EVALUATION AND STATISTICS IN LEGAL PROCEEDINGS

If seizures exist, the problem is to determine if it is post-traumatic and if possible to evaluate the severity. This is a purely medical problem based on some of the principles previously described.

The perplexing problem to physician, lawyer, and patient alike, is how to establish a reasonable probability that a given complication will develop. Utilizing the information here presented, one has the basis for rough mathematical estimates.

For example, in a civilian head injury caused by a blunt instrument, not a missile, with penetration of the skull and dura mater, the incidence of epilepsy will probably not reach twenty per cent. Since at least two-thirds of cases of post-traumatic epilepsy will develop within a 2 year period (and this is a minimal figure), if by the end of 2 years the patient has not developed epilepsy, he now has only a 6⅔% chance of doing so. Thus, other fac-

tors excluded, the presumption becomes that the odds against the development of post-traumatic epilepsy are 16 to one.

As another example, one might return to the semihypothetical case of Belli mentioned earlier. The key features were 1. A non-depressed skull fracture, 2. No evidence of penetration of dura or local brain injury, 3. No evidence of an abnormal EEG, 4. Negative neurological examination, 5. The passage of a year, and 6. No history of injury (and if one was present, apparently not an injury by a missile, nor a severe head blow at high speeds by a blunt instrument).

It is not necessary to comment on all these features. As to the first, the incidence of post-traumatic epilepsy in such cases may be hypothecated as being less than 2% (many neurologists feel that, without local brain injury, such an injury is almost totally irrelevant to the development of epilepsy). As to number 5, since in one year more than a majority of cases will develop epilepsy if, in fact, it will develop at all—then the chances here become less than 1%. The odds are now so low that without localizing brain injury and relevant EEG findings, if epilepsy did develop, it would most likely be a case of idiopathic rather than post-traumatic epilepsy. Without laboring the point, it may be summed up by saying that this case has become a statistical nullity.

To quote an expert in this subject, A. E. Walker(49)—admittedly out of context:

> May we not say, then, with reasonable medical certainty, that if a patient without neurological symptoms or deficit and having a normal EEG has gone two years after his injury without seizures, he will not develop post-traumatic epilepsy?

Smith(43) in his excellent article states:

> The risk of epilepsy following head injury is of the following order after simple concussion of the brain—0.02%; after linear fracture of the cranial vault—0.521%; after severe head injury with depressed fracture of the skull, fragments of which have lacerated the dura mater and brain—20 to 45%. It follows that in no case can the plaintiff prove probable future occurrence of traumatic epilepsy which has failed to materialize by the time of trial without adducing strong corroborative evidence of impending epilepsy such as significant changes in serial electroencephalograms interpreted and supported by competent neurological opinion.

Thus, an effort to indicate a probability of occurence where, in fact, it has not yet occurred, faces an uphill statistical struggle. Based on the factors described, the physician can give a reasonable opinion to the court for utilization in deciding such problems. However, legal proceedings are most haphazard. Logically, no claimant should ever win a case if he has not had demonstrated epileptic attacks by the time of trial. Yet to so rule would be to deny compensation to those who do legitimately develop post-traumatic epilepsy at a later date. Walker(45), in a very imaginative suggestion, recommends that instead of awarding compensation to potential post-traumatic epileptics, an insurance policy should be granted with benefits to be paid on development of the complication. In this way, the patient will be compensated if seizures develop. If seizures do not, the patient will not be stigmatized and the primary agent will not pay a penalty.

> Even if post-traumatic seizures do develop, it should be clearly understood that they do not have the same prognosis and implications as does so-called idiopathic epilepsy. In fact, if a patient has had only one or two attacks within the first year or two after a head injury, I would certainly hesitate to suggest compensation on that basis. Probably some type of epilepsy insurance would be the most equitable means of handling these cases. There is excellent evidence that such patients have a good chance of living lives which will not be punctuated by convulsions.

He feels that actuaries could work out a usable system. Certainly high standards of evaluation would be needed both to screen out fradulent claims and to protect the rights of the injured.

Related to this is the suggestion that some effort be made by an organized group of neurologists to collect standardized data on head injuries on a national scale. For instance, every head injury treated at training centers might be reported with the following information—type of injury, presence or absence of demonstrable brain injury, EEG findings, neurological examination, *etc.* Periodic follow-up could be done. Thus, a massive accumulation of data con-

cerning injuries in civil life could be analyzed. It is apparent from the variety of articles with frequent contradictions that failure of uniform reporting has brought confusion which is then reflected in the expert medical testimony needed in the legal disposition of such cases.

It has been the goal of this article to correlate various reports and opinions so that present knowledge may be applied as usefully and as accurately as possible.

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THE EFFECT OF RESOCIALIZATION TECHNIQUES ON CHRONIC SCHIZOPHRENIC PATIENTS [1]

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Because chronic schizophrenic patients constitute the bulk of prolonged care patients in mental hospitals, there is need to identify the factors contributing to the chronicity of the schizophrenic illness and to discover better methods of management and treatment for these patients. The purpose of this study was to investigate certain aspects of these problems.

One of the principal manifestations of schizophrenia is social isolation(1, 7, 17). The patients become withdrawn, avoid interpersonal contacts, and seek a reduction in external stimulation. The isolation of patients cannot be studied in any restricted sense, but must be viewed in terms of their entire personality adjustment. The chronic schizophrenic patient shows a failure of communication, along with the use of withdrawal and autism as defensive mechanisms, which in turn impede the patient's assumption of a social role within the family and society(4). With chronicity of the illness, schizophrenic patients tend to accept their isolation, cling to it in a hostile manner, and resist the stimulation of others for establishing interaction.

The symptom of isolation may be augmented through routine mental hospital management with its limited resources(2, 5). The custodial management of the chronic schizophrenic patient is often aimed at subjection and control, rather than at an understanding of behavior. Problems arise because of the vast numbers of the mentally ill, the small number of employees with suitable training, and the relatively low status and financial rewards for such employees. Characteristically, few social contacts occur on the disturbed wards, opportunities for heterosexual interaction are limited, and patients tend to be chronically preoccupied with their own inner conflicts. As the patient's hospitalization continues, his motivation for recovery becomes reduced, and he further clings to his hostile isolation, making it more difficult for personnel to relate with him. Thus employees may gradually begin to feel that attempts at helping patients are hardly worth the effort.

This study investigated the therapeutic effects of an intensive socialization and activity program on an experimental group of chronic disturbed schizophrenic patients. These patients were selected from a large state hospital and placed in a research and teaching hospital. The period of active work with the patients was 9 months. A control group, meeting the same criteria as the experimental group but remaining at the state hospital without any special treatment, was evaluated at the beginning and end of the project to compare changes in the 2 groups. Follow-up evaluations were also made.

The intention was to provide an approach which could have practical application within a state hospital setting(8, 9, 10, 11, 14, 15, 16). For this reason no individual psychotherapy was used. For the experimental group the aim was to make the fullest possible therapeutic use of the personnel and resources available. Individuals from various disciplines, including psychiatry, nursing, occupational and recreational therapy, sociology, psychology, and social work constituted the treatment and research team. It is realized that such a study involves numerous uncontrolled variables. This report will be concerned mainly with the psychiatric evaluation of the patients.

RESOCIALIZATION AIMS WITH THE EXPERIMENTAL GROUP

One of the major differences between the experimental situation and the ordinary state hospital was the greater number of personnel available to work with the experimental group patients. The ratio of

[1] Read at the 115th annual meeting of the American Psychiatric Association, Philadelphia, Pa., Apr. 27-May 1, 1959.

[2] The Lafayette Clinic and Wayne State University College of Medicine, Detroit, Mich.

personnel to patients was 1 to 2, while at the state hospital the ratio was about 1 to 20 or more. The participating staff were all under the direction of a staff psychiatrist who was in charge of the overall operation of the experimental program. A resident psychiatrist was responsible for working with the patients and personnel. The nursing staff had considerable responsibility in acting directly with the patients. The head nurse had administrative duty, such as conducting ward conferences, making broad assignments to the staff, and coordinating their function. Staff nurses had close and prolonged contact with patients, and worked closely with occupational and recreational therapists in planning and administering the detailed activity programs. The attendant nurses were expected to learn to know each individual patient, to acquire an understanding of the patients' behavior, and to use this knowledge constructively in promoting recovery. The social worker attempted to work closely with a family member of each patient, with the aim of stimulating interest and evaluating the home situation as a possible resource for discharge. Two sociologists lived on the ward, observing and interacting with the patients.

The goals of the socialization program were to stimulate interpersonal relationships among the patients, and to foster resocialization and integration of ego forces. The program permitted patients to operate at their own levels of functioning, with encouragement to progress to higher levels by providing suitable activities. Insofar as possible, there was an attempt to have the patients participate in the weekly patient councils and daily program planning meetings so as to fit the program to their needs and desires. The patients lived together on one ward, and were not segregated by sex in the living and dining area.

Various drugs were used in treatment, but principally chlorpromazine and reserpine. The use of drugs was dictated by disturbed behavior and was kept at a minimum. No attempt was made to standardize the use of drugs throughout the group.

All the patients participated in group psychotherapy along with various members of the ward staff. The aim of the meetings was to encourage the patients to discuss their feelings and problems as they occurred on the ward, and the ways in which these factors were related to their illness and personality adjustment.

SUBJECTS

The patients had the following characteristics : diagnosis of schizophrenia, chronically ill and disturbed prior to the use of drug therapies, ages between 22 and 40 years, hospitalized 3 years or longer, Caucasian race, some family member available for contacts with the hospital, no marked physical defects, no recent electroconvulsive therapy, and average intelligence as estimated from clinical impression. Of the 20 men and 20 women, 10 men and 10 women constituted the experimental group, the remainder the control group. An attempt was made to match the experimental and control patients in pairs of the same sex so that they would be equivalent in age, type of symptomatology, duration of hospitalization, and general appearance. Comparative data for the 2 groups are given in Table 1.

PROCEDURES OF OBSERVATION AND DATA COLLECTION

Techniques used by the psychiatrists and nursing staff focused mainly on appraisal of the individual. Both groups were evaluated at the beginning and end of the project, and again 20 months later.

The Hospital Adjustment Scale(6, 12) was used to measure the patient's adjustment to the hospital situation ; it is based on clear descriptions of overt behavior, such as personal appearance, hygiene, amount of activity, and social participation. These scales were filled out by the head nurse and a psychologist ; at the state hospital the necessary information was secured from an employee who knew the patient well.

Both psychiatrists examined the patients clinically, following a standard form for mental status examination, and rated the patients on the Malamud-Sands psychiatric rating scale(13). This scale was used to give an objective indication of the degree of psychopathology ; it includes items for evaluation of general behavior, thought content, mood, affectivity, and association

TABLE 1

MEAN AGE AND DURATION OF HOSPITALIZATION BY GROUPS AND SEX

	Experimental Group (N=20)		*Control Group (N=20)*	
	Mean Age	*Mean Duration of Hospitalization*	*Mean Age*	*Mean Duration of Hospitalization*
Men	29.6	6.4	32.1	8.0
Women	32.7	7.2	33.0	7.8
Total	31.1	6.8	32.5	7.9

processes. At the end of the project the psychiatrists also rated the patients' overall change. A follow-up was made by social workers to determine the status of the patients 8 months after termination of the project. Twenty months after termination the available patients were rated by the staff psychiatrist on the Malamud-Sands Scale, and the Hospital Adjustment Scale was also administered.

For the experimental group, the Malamud-Sands ratings and the Hospital Adjustment Scale were also obtained at 2 intermediate times—approximately 3 and 6 months after initiation of the project. Since these interim data did not provide any additional information, they will not be reported here.

The experimental group patients were observed at meal times by the sociologists, who recorded on a diagram where each patient sat. The tables each seated 4 patients, and there was a consistent pattern of furniture arrangement. Observations were made during the first 8 months of the project; for anaylsis they were grouped into 16 sets of 20 meals each. One aspect of these data will be reported here, *i.e*, the number of associations with the opposite sex. For each patient the percentage of heterosexual associations was obtained for each of the successive sets of meals. The 10 men were divided into 2 groups of 5 each, an "improved more" and an "improved less" group. This classification was based on the clinical judgment of the psychiatrists. The mean percentage of heterosexual associations was calculated for these groups. The women were similarly divided into 5 "improved more" and 4 "improved less." Data were not available for one woman, who would not voluntarily eat at the table.

RESULTS AND DISCUSSION

The mean Hospital Adjustment Scale scores are presented in Table 2. The experimental group was slightly better adjusted than the control group, and the women slightly better than the men, but neither of these differences was significant. The one clear change from the initial to the terminal test is that the experimental group men improved significantly ($p<.05$), coming up to the level of the experimental group women. A possible explanation of the relatively poor mean score of these men on the initial test is the lack of heterosexual interaction for them on the chronic wards of the state hospital. Female patients at least have some interaction with male physicians. The lack of improvement on the terminal test for the women may be due to the marked exacerbation of schizophrenic symptomatology in 2 female patients, which undoubtedly offset the slight to moderate improvement seen clinically in the other women. Differences between mean scores at termination and 20 months later were not significant.

Looking at the results of the Malamud-Sands ratings in Table 2, it is apparent that the two psychiatrists differed in their evaluation of the patients' psychopathology. Dr. A rated the patients slightly better on the terminal than on the initial test, but this difference was not significant. According to his ratings, the experimental group did not differ from the control group, nor did the men differ from the women. Dr. B's ratings, however, showed the experimental group as significantly less pathological than the control group ($p<.05$), and the patients in general as better on the terminal than on the initial test ($p<.025$). His ratings tend to indicate greater improvement for the experimental than for the control

TABLE 2

HOSPITAL ADJUSTMENT SCALE AND MALAMUD-SANDS RATINGS
INITIAL, TERMINAL, AND FOLLOW-UP MEAN SCORES [1] BY GROUPS AND SEX

	Experimental Group		*Control Group*	
	Men	*Women*	*Men*	*Women*
Hospital Adjustment Scale [2]				
Initially	51.5	69.5	46.5	58.0
At Termination	66.3	65.2	39.6	60.5
20 Months Later	61.9	74.3	57.2	55.9
Malamud-Sands Ratings [3]*—Dr. A*				
Initially	54.4	57.8	57.4	60.2
At Termination	46.7	53.5	52.9	58.0
20 Months Later	56.0	49.0	48.4	52.1
Malamud-Sands Ratings [3]*—Dr. B*				
Initially	46.1	46.8	49.0	50.0
At Termination	35.2	32.2	46.2	48.8

[1] Each mean is based on 10 cases, except for the 20 month follow-up, where N=8 for the Experimental Group women and N=9 for the Control Group men.
[2] The higher the score, the better the adjustment.
[3] The lower the score, the better the adjustment.

group. Inspection of Table 2 also reveals the interesting fact that Dr. B's mean ratings in every case were more favorable than Dr. A's. Each psychiatrist had equally brief contact with the control group patients; here Dr. B rated the patients slightly more favorably than did Dr. A. Dr. B diverged even more from Dr. A with respect to the experimental group. This is no doubt a reflection of the fact that, in addition to a generally more favorable rating tendency, Dr. B was much more closely and intimately involved with these patients than was Dr. A, whose contact with them was more limited.

Dr. A's follow-up ratings did not differ significantly from those at termination, except for the experimental group men, who were rated as significantly worse ($p<.05$); these follow-up ratings were approximately the same as the initial ratings.

In their terminal clinical ratings of change (Table 3), the 2 psychiatrists agreed quite closely in their evaluations of the experimental group; each considered 9 patients (45%) to have shown some improvement. For the control group, they also agreed fairly closely as to the number showing improvement, but differed somewhat as to the number of patients rated worse, with Dr. A in this case giving the more favorable ratings. In comparing the 2 groups, these ratings favor the experimental group.

Since the 2 psychiatrists tended to agree more consistently in their overall clinical ratings of the patients than in their Malamud-Sands ratings, it is concluded that certain personal discrepancies occurred in the utilization of the latter device. Therefore conclusions drawn solely from the Malamud-Sands ratings are ambiguous.

Although numerically Dr. A's ratings at termination and 20 months later were essentially the same, it is interesting to note that many of these figures do not refer to the same patients, indicating the variability

TABLE 3

OVERALL CLINICAL RATING OF CHANGE

	Experimental Group			*Control Group*		
	Worse	*Same*	*Improved*	*Worse*	*Same*	*Improved*
At Termination—Dr. A	2	9	9	2	11	7
At Termination—Dr. B	2	9	9	6	6	8
20 Months Later—Dr. A	1	11	8	1	13	6

of symptomatology over a period of time.

Table 4 reports the disposition of patients at termination of the project and 8 and 20 months thereafter. At termination, 6 members of the experimental group were able to leave the hospital and be placed on family care or convalescent status. No patients were able to assume any degree of responsibility for themselves, and they continued to require supervision. During the 8 month follow-up interval, no further significant change occurred. After 20 months, only 3 experimental group patients were outside the hospital. Thus the experimental group lost its apparent advantage over the control group. The number of experimental group patients placed outside a hospital at termination may reflect the therapeutic enthusiasm of the participants. The patients' relatives may also have contributed to this enthusiasm, as well as gaining a greater acceptance of the patients' pathological behavior. The lack of any sustained improvement over a prolonged period led to their return to the hospital.

In observations of clinical changes in the experimental group, it was impressive that the accessory schizophrenic symptoms, as defined by Bleuler(3), improved somewhat, while the fundamental symptoms remained relatively intact. Such accessory symptoms as hallucinations, delusions, and hypochondriasis were reduced. The patients tended to block less often in their verbal productions, and related much better in interpersonal situations. Improvement was apparent in disturbed behavior patterns and catatonic symptoms. Thus some of the social isolation of these patients was overcome, but the fundamental schizophrenic symptoms persisted, particularly the disturbances in the associations and affectivity.

An interesting feature evident in these patients was the periodicity of the symptomatology. Over several months, some patients improved, then maintained their improvement for a few weeks or months, only to relapse again into severe schizophrenic psychopathology. At times it was possible to relate such a relapse to certain specific stimuli, such as a traumatic visit home with the patient's family. Certainly the patients were very sensitive to any type of situational stress. This marked sensitivity toward stress has tremendous significance in any attempt at rehabilitation, since return to society necessitates a capacity to tolerate a number of stresses from which the patients have isolated themselves successfully by their illness and their hospitalization.

In having both sexes function together in most of their activities in the experimental setting, a number of significant patterns of sexual behavior were observed. Autoerotic behavior, genital exhibitionism, and overt masturbation occurred rather infrequently compared with the attempts at establishing object relations. Patients enjoyed holding hands, embracing one another in certain situations, kissing, fondling, and other types of sexual advances. These occurred in a very impulsive fashion; for example, some patients would go from one to another patient, kissing and fondling, often not differentiating one sex from the

TABLE 4

DISPOSITION AND FOLLOW-UP OF PATIENTS

	Hospitalized	*Family Care* [1]	*Convalescent Status* [1]
Experimental Group			
At Termination	14	5	1
8 Months Later	13	5	2
20 Months Later	17	0	3
Control Group			
At Termination	19	1	0
8 Months Later	18	2	0
20 Months Later	17	1	2

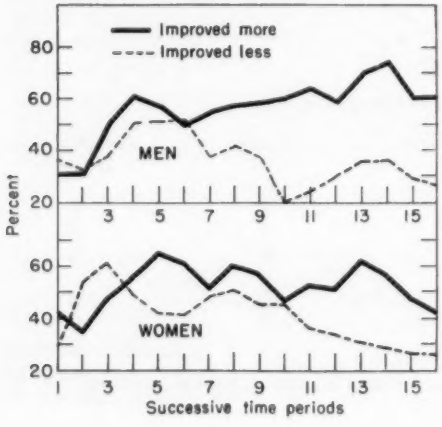
[1] Family care and convalescent status are dependent on improvement in behavior, but not necessarily on any change in basic psychopathology.

other. Most of this behavior was heterosexually rather than homosexually directed; in discussions with the patients they expressed pleasurable feelings about it. Poor judgment was evident in their expression of such behavior, and they had little understanding of social attitudes toward their impulsive sexuality. Most of the sexual behavior was of a tactile and oral type. Although patients attempted genital stimulation, such behavior was prohibited in the atmosphere of the hospital. These observations illustrate that sexuality in the schizophrenic patient is not totally repressed nor solely narcissistic, but that attempts at some type of primitive object relation occur.

That the ability to engage in heterosexual contacts bears some relation to amount of improvement shown by experimental group patients is evidenced by Figure 1, which shows the course of heterosexual associations at meal times for men and women, divided into those who improved more and less. At the state hospital, opportunities for any heterosexual relationships were very limited, and particularly so for the men, since for the most part they had male doctors and attendants. In view of this previous history, it is interesting that for both sexes, but particularly strikingly for the men, the "improved more" patients showed in general a consistently greater number of heterosexual associations at meals. For the men who improved more, there was a steady rise in heterosexual associations during the 8 months covered, beginning at about 30% and increasing to from 60% to 75% of such associations. For both the men and the women who improved less, there was a fairly steady dropping off in heterosexual associations in the last 4 months of the project, with both these groups ending at about 30% of such associations.

FIGURE 1

HETEROSEXUAL ASSOCIATION AT MEALS IN RELATION TO IMPROVEMENT AT TERMINATION



A number of personnel problems were manifest in this study. It is interesting to note that the majority of the personnel in the experimental situation were Negro, while the patients were all white. The effect of this racial difference was not measured, but it seems reasonable to speculate that it would make for greater difficulty in establishing close interpersonal relations between staff and patients.

Many of the nurses and attendants lacked a suitable background of education or experience for much of the work required. Throughout the project the personnel were asked to assume greater responsibility for the management and treatment of the patients, and to attempt to establish a close relationship with them, in spite of the patients' hostile isolation. Initially the personnel showed tremendous enthusiasm, but with the many frustrations involved much of this enthusiasm waned. It was apparent from the study that psychiatric nursing practices are poorly defined, and that nursing personnel are often confused in their work with patients. Status problems were created by the attempt to give a more therapeutic role to the nursing personnel; this factor may have limited their influence on the patients. The research ward staff had greater prestige and status in terms of the additional role in which they functioned, but this role required a greater responsibility and in many ways a reduction of the distance between personnel and patients. The aloofness often maintained by nursing personnel had to be overcome, and in this process insecurity feelings were often evident. With such frustrations and feelings, individual personal problems of staff members were intensified. This led to undue emphasis on many insignificant aspects of

ward operations, with fewer attempts at active interpersonal contact with patients.

From the viewpoint of effects on the basic schizophrenic psychopathology, the results of this study were not encouraging. The practical application of these specific techniques to larger chronic schizophrenic populations, such as those in state mental institutions, does not seem warranted in view of the limited improvement seen in the accessory symptoms, the large numbers of personnel and special facilities needed, and the associated high financial expenditures. As far as this study has demonstrated, modifications of hospital culture have little or no impact on the basic schizophrenic psychopathology of chronically disturbed patients, and other approaches to the solution of the problem must be sought.

These results do not preclude the possibility that intensive socialization techniques are beneficial to many psychiatric disorders, including schizophrenia, particularly during its early manifestations when there is a greater chance for reversibility of the process. This problem was not evaluated in the present study. The results merely emphasize the limitations of socialization programming in attacking the basic psychopathology of the chronic schizophrenic patient and in effecting consistently satisfactory treatment results.

Summary and Conclusions

A description has been given of a rehabilitation research project for chronic disturbed schizophrenic patients who had been hospitalized on the average for about 7 years.

In the experimental group a modification was seen in many of the accessory symptoms of schizophrenia, such as disturbed behavior, delusions, hallucinations, muteness, and withdrawal; these changes allowed a tenuous type of socialization. The fundamental symptoms of schizophrenia, the disturbances in associations and affectivity, remained. The control group demonstrated essentially no change. Follow-up evaluations of the hospitalization status of both groups 8 and 20 months after termination of the study showed almost no further changes.

In the process of resocialization of the chronic schizophrenic patient, a primitive type of sexual object relation occurs, manifested in both homosexual and heterosexual behavior. It is suggested that patients who can engage more in heterosexual contacts, when these are available, are more likely to show a generally improved social adjustment.

The changes observed were considered to be of limited therapeutic significance in view of the numbers of personnel involved, special facilities, and resultant costs for such a program. Further limitations influencing the practical aspects are the difficulties experienced by personnel interacting in a close relationship with chronic schizophrenic patients. These include adverse personal reactions, status problems, and difficulties in maintaining a consistent interest in the project.

It may be concluded that in the schizophrenic illness, the accessory symptomatology is related in part to psychocultural factors and can therefore be modified by socialization techniques, as described in this study.

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A CORRELATION OF SYMBOL ORGANIZATION WITH BRAIN FUNCTION (EEG)[1]

ROBERT COHN, M.D.[2]

When physical changes of the environment operate on the sensing organs of the body, patterned impulses are impressed on the more central receiving systems to generate psychophysiological information that something has happened. Although sense data are obviously derived in a space-time continuum, the necessary repetitions and reinforcements of sense data as evidenced in "learning" prior to recognition of "significant" activity, actually tend to divorce sense data from the particularity of time. Consequently sense data appear to be of the dimensions of space. This conforms to the idea of spatial organization being paramount in discriminative brain function. Because these sense data cannot generate in the brain an exact replication of the physical excitants, the transmitted data must be patterned in such a way that the brain receiving mechanisms recognize the recurrent impulses. In that recognition must result from a coded action, it, therefore, must be an abstraction of the physical changes; I would like to designate this perceptual phenomenon as a first order symbolic process.

Inference(1), which connotes the role of indirect, impersonal determinants of behavior assumes two major forms; 1. Representational and 2. Non-representational.

In this paper the representational mode is designated as a second order symbol. Such second order symbols are exampled by picture or sound forms which through convention, or gross two- or three-dimensional similarity to the physical data, present to the brain material that evokes, or may potentially evoke, behavior just as if the physical elements themselves had been presented. Thus, although the symbol of water in a picture has not the property of wetness, fluidity, and mass, it nevertheless conveys to the brain the idea of the physical element with all the properties noted above, and which under certain conditions is able to generate behavior just as if the actual water were present.

When the symbol processes become sufficiently non-representational so that they in no way convey a paradigm of the physical data for which they are a token, a new level of symbolization is achieved; these I will designate as higher order symbolization processes. This higher order, abstract behavior operator may be best demonstrated in the evolution of written languages, in which the earlier representational anatomical part, or other common objects of the environment became generalized to form marks divested of analogs of their origin.

Thus, through direct sense data, and inferences derived indirectly through reactivation of remote experiential data and through higher order symbol operations, the organism is made aware of its existence. This existence is thus derived through the process of symbol formation and symbol transformation.

One facet of the second and higher order symbolization processes is brought under consideration here: the drawing of the human figure. The use of the pictorial form of man carries with it an inherent element of uncertainty. This uncertainty results from the inability to weight the relative content of the representational and higher order symbols in any particular portrayal. Even in the simplest presentation, the *representation* component is manifest in, at least, composition. To accentuate this basic uncertainty, any elementary part of the depiction may be construed as a second or higher order symbolization depending on the sophistication of the observer. Despite these fundamental problems, the study of picture drawing affords information as to the process of symbol formation, symbol use, and symbol dissolution.

It has been observed that the spontaneous pictorial production in many 3½-year-old

[1] Read at the 115th annual meeting of The American Psychiatric Association, Philadelphia, Pa., Apr. 27-May 1, 1959.

[2] U. S. Naval Hospital, National Naval Medical Center, Bethesda, Md.

children may be bizarre with little evidence of representation of the human figure, even in elementary composition. To a high degree this appears to be the result of an inability to order volitionally the parts in a sequential way.

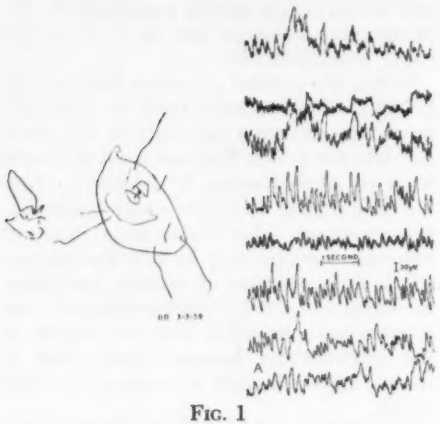
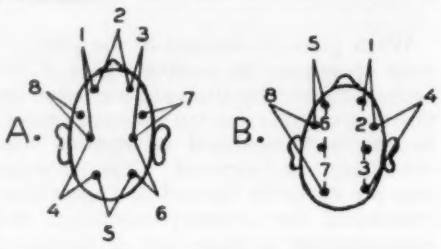


FIG. 1
SPONTANEOUS PICTURE (LEFT). PICTURE DRAWN TO DICTATION (RIGHT).

In Figure 1, the picture to the left, drawn by a child of 3½ years, constitutes the spontaneous "picture of a girl." Real effort was expended; the child named several face parts as she made incomplete, complex drawings. The picture to the right was the result of dictation; here each part was given to her by name in the following order: head, eyes, ears, legs, belly, arms, nose, mouth, and hair. It is observed that the whole person is encompassed in a closed space symbolized as "head." This output, of course, is similar to the normal production of a child of the age range between 3½ and 5½ years. This portrayal is of particular interest in that this child, as most children of this age group, can correctly point to all body parts when asked to do so from a two-dimensional manikin. Such command productions strongly suggest that the child has a much better organized body image concept than would be gleaned from the spontaneous formulation. It is of interest also, as seen in the figure, that the electric [3] output of the brain in these children generally is not well organized when compared with adult records.



That the form of the child's picture of a person may be quite independent of a particular culture is shown in Figure 2.

FIG. 2
PICTURE OBTAINED FROM LACANDONIAN INDIAN BOY, AGE 6 YEARS.

This picture was drawn by a 6-year-old Lacandonian Indian boy from Chiapas, Mexico, who had only been out of the jungle for approximately 4 months. Because of bilateral congenital cataracts, the boy was not observed to indulge in spontaneous graphic expression, nevertheless the accomplished picture, in all ways, is

[3] Electrode Placement: The number corresponds to tracing line. Top line is number 1.

consistent with the average child's production of the same age in our own culture.

It has been observed that the pictorial presentation in the normal adult individual is remarkably constant. This is shown in Figure 3. The picture on the left was produced in 1955; that on the right was made in 1959. The contours and general composition are remarkably similar. The EEGs and neurological examinations were in no way remarkable. In other drawings, it is also observed that despite various distortions of the picture during the phases of most disturbed brain function, the basic contours and compositions retain their characteristics in serial portrayals. In children this conservatism does not prevail. This is demonstrated in Figure 4, where, in the course of one year, a portrayal may change from a child's type to that of the adult pattern. The EEG may mature in a similar way.

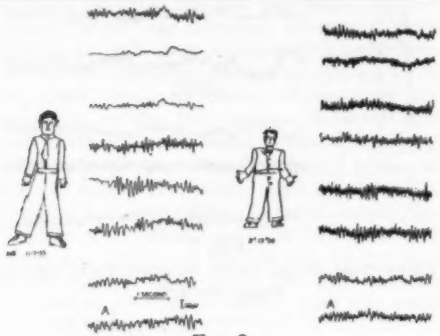


FIG. 3
CONSTANCY OF ADULT PORTRAYALS.

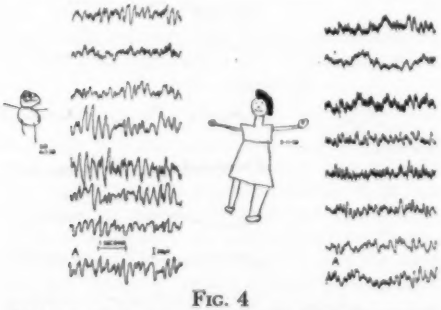


FIG. 4
MATURATION OF PICTURE DRAWING WITHIN ONE YEAR. ALSO "MATURATION" OF EEG PATTERN.

In the adult, it is a common, but not an invariable phenomenon, that behavioral attributes are manifest in the depictions of the human form. Such depictions are particularly evident during stress situations (Figure 5).

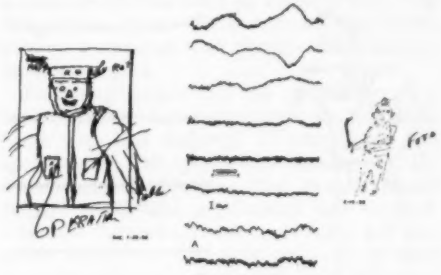


FIG. 5
REPRESENTATIONAL PICTURES.

The patient was a Captain in the Navy who on retirement was elevated to the rank of Rear Admiral. Approximately one month prior to examination he sustained a possible fracture of the middle cervical vertebrae. He was placed in traction by means of Crutchfield tongs and then immobilized in a body-head cast that extended from the pelvic level to the top of his head; openings were allowed for the crown of the head, the ears, face, and arms. Within a few days following this restrictive immobilization, he began to hallucinate, to indulge in mysterious Morse code messages, and to engage in a rambling continuous type of verbalization.

The spontaneous picture production at this time was certainly representative of his plaster uniform. It will also be observed that he placed his two stars over the upper part of the symbol of the cast. In such productions, there is little doubt of "self" portrayal. The EEG showed no gross abnormality. The depiction to the right is from the same patient 7 weeks later. This production occurred in a phase of "recovery"; he spoke in a low tone of voice and was entirely logical in all verbalizations. He discussed his family and his imminent discharge from the hospital. It is observed that the delineations are incomplete, perseverative and that little pressure is exerted with the pencil. He was obviously very introspective and quite ill-at-ease.

The representational quality of picture production is also evident in the large number of neurologically normal subjects at this hospital who portray uniformed persons (Figure 6). No significant EEG

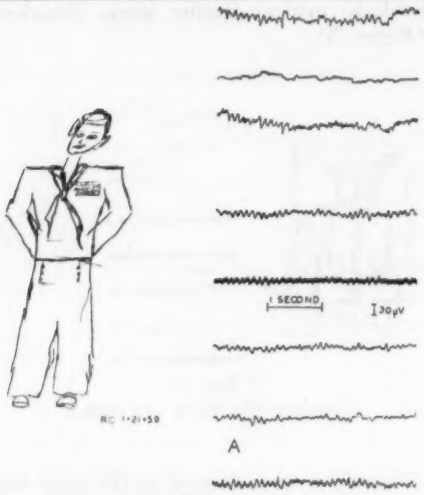


FIG. 6
REPRESENTATIONAL PICTURE.

findings are evident in the excerpt of this particular subject.

The common factors in the above types of production which have been illustrated are: (a) the presence of sentient brain organization; (b) the retention of instrumentalities to accomplish the pictorial operation.

Acute unilateral lesions of the central visual apparatus, involving the geniculocortical pathway, generally result in remarkable asymmetric distortions of the person symbol (see Figure 7).

The patient was 65 years old. Approximately 10 days prior to study, he was working as a watchman when he suddenly became unable to stand. He did not lose consciousness, nor did he complain of headache. On examination he maintained conjugate gaze to the right; there was a left homonymous hemianopia. In reading the word "Chester," he saw only the "ter" and read "Peter." He discussed his aspirations and his concern about his ability to achieve them. While speaking, he often showed forced crying. There was no evidence of denial of illness despite an almost hemianesthetic

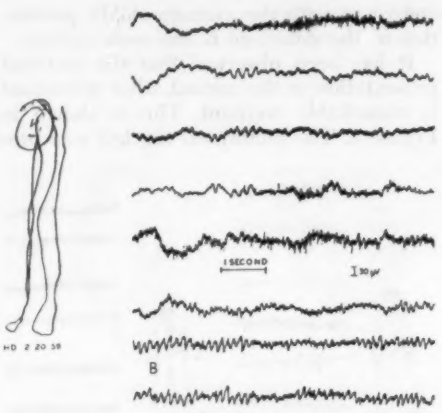


FIG. 7
DEPICTION WITH LEFT HOMONYMOUS VISUAL FIELD DEFECT.

left side; position sense of the upper extremity was absent even at the elbow joint. The reflex pattern on the left side was indicative of pyramidal motor system involvement. The picture showed a head element with attached lower extremities abutted in a disconnected way on the right side of his drawing; although the eyes were omitted, an attempt was made to place hair on the head. The EEG showed slow activity in the post-rolandic derivations of the right brain.

Another case of the effect of visual field disturbance is shown in Figure 8.

This patient was 20 years of age. Three months prior to the examination he had a strep-

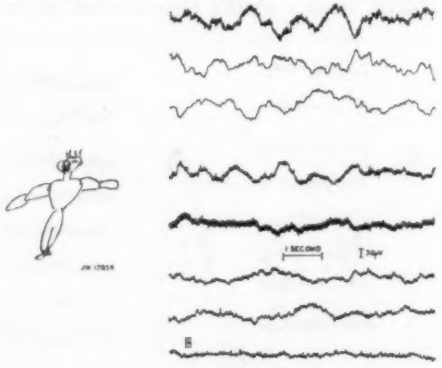


FIG. 8
FACE AND HEAD DISTORTIONS IN LEFT HOMONYMOUS HEMIANOPIA.

tococcal meningitis ; he apparently recovered but later developed signs indicative of a brain abscess. Following the abscess evacuation, a spastic left hemiplegia including the face ensued. On examination he complained of generalized head pain. Speech was ideationally and mechanically intact. Over the left side epicritic sensation function was decreased, but position sense was disturbed severely in both the upper and lower extremities. Localization of areas of cutaneous stimulation was markedly impaired. The deep tendon reflexes were hyperactive on the left, but no Babinski sign was elicited. A left homonymous hemianopia was observed ; however, he seemed aware of the left space. The picture drawing showed a simplicity of composition, but was noteworthy because of the displacement of face parts and head appendages on the left side of the portrayal (his left visual field). The EEG showed an intense slow wave output over the right cerebral hemisphere.

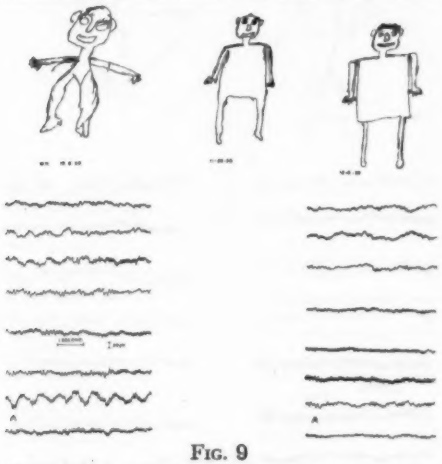


FIG. 9

DISTORTION ASSOCIATED WITH BRAIN ABSCESS (RIGHT TEMPORAL REGION). NOTE SIMILARITY OF FACE FEATURES.

Figure 9 is the production of a 35-year-old man who 3 months previously had a right mastoidectomy. He was oriented for time ; no right-left confusion or disturbed space concepts were elicited. He yawned repeatedly and complained of a severe headache over the right eye and temporal region. The left eyeground showed papilledema with hemorrhage. The right pupil measured 4mm. and the left 3½ mm. in diameter ; they responded to light and in convergence. A tennis ball was called a "rubber ball" in the left hand ; in the right hand, the ball was named correctly. The persistence time to pin prick was increased, and the adaptation to pin prick was more rapid over the left side. The deep tendon reflexes were approximately equal. No Babinski signs were elicited, but abortive ankle clonus was more marked on the left side. His first picture drawing (left) consisted of a remarkably disproportioned telescoped individual ; the extremities were approximated to the body in a rough way. The delineations were perseverative. The EEG showed prominent slow activity over the left temporal region.

Following surgery for the evacuation of a brain abscess he maintained an immobile facies ; he had difficulty in recognizing the spoken word. His speech was monotonous. He named colored objects applied in each lateral field of vision. The papilledema had receded. The face showed asymmetry in static and dynamic action on the right side. His tongue deviated to the left when protruded. There was reduced perception of the big toe position on the left, and the deep tendon reflexes were increased in amplitude on the same side. On December 8, 1958, it was observed that the left homonymous visual fields were non-functional. The right face was still less mobile than the left. Occasionally the left leg indulged in spontaneous clonic activity. There was marked reaction to cold when applied over the entire left side of the body. This patient's picture drawing was symmetric, but the lines were dystaxic and perseverative. Despite the obviously different compositions of the 3 pictures, the mouthparts, eyelashes, eyes, and ear formations are similar in each production. The EEG had returned to an essentially normal type by the time of the third picture.

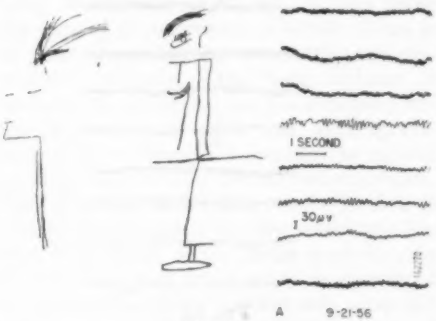


FIG. 10

DISTORTION IN PICTURE WITH LEFT HOMONYMOUS HEMI-INATTENTION.

Figure 10 was obtained from a 63-year-old man who awakened with clumsiness of the extremities of the left side on September 3, 1956. At no time was there headache. Speech was ideationally and mechanically adequate. There was no denial of illness. There was hemi-inattention in the left fields of vision with simultaneously applied objects in the temporal visual fields. He failed to resolve homolateral double simultaneously applied cutaneous stimuli on the left side. Position sense of the digits of the upper and lower extremities was disturbed. The maximal left-sided weakness of the extremities was in the proximal elements. Deep tendon reflexes were increased in amplitude over the left side. No Babinski signs were elicited.

The picture drawings showed a modified incomplete profile. The parts of the left visual field were omitted. Perseverative delineation was also evident. The EEG output was dominated by 6 and 7½ per second activity.

On January 30, 1959 the patient was again studied ; he remembered his previous visit. He walked in a slow insecure way ; there was a reduced amount of associated movement of the right upper extremity. He spoke rapidly, apparently to retain the contextual thread. The left visual field inattention persisted as he occasionally was surprised to "see his left hand come into view." The picture production, Figure 11, is remarkably similar to that observed previously. The 7 per second activity of the EEG is somewhat more prevalent than in the earlier tracing.

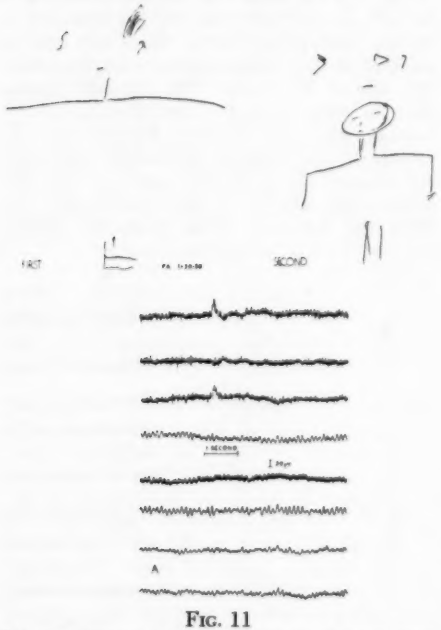


FIG. 11

SAME PATIENT AS IN PRECEDING FIGURE TWO YEARS AND FOUR MONTHS LATER. NOTE SIMILARITY OF DEPICTIONS.

In toxic states the distortions in the pictorial representations are general in distribution. The distortions may consist in varying degrees of combinations, of exaggeration of parts, grotesqueness of composition, of telescoping, or of perservation of the delineations.

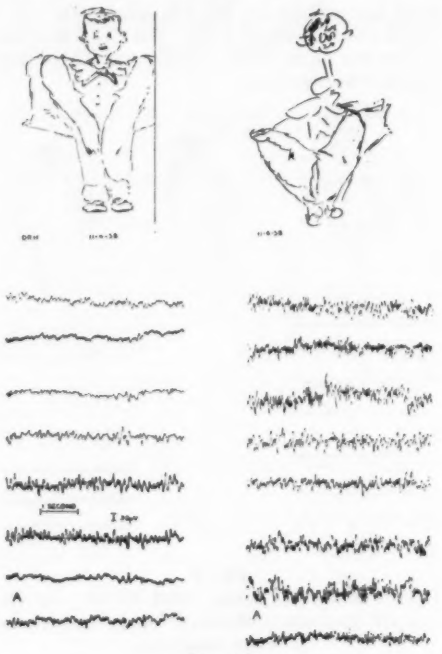


FIG. 12

SPONTANEOUS PICTURE (LEFT). EFFECT OF ALCOHOLIC INTOXICATION (RIGHT).

Figure 12 was obtained from a 30-year-old officer who shortly after reporting for active duty had a witnessed grand mal seizure. On neurological examination no gross abnormalities were observed. His picture was of a stylized "angelic" type (left) but aside from failure to plan for the edge of the paper on the right the picture was symmetrical. The

picture on the right was obtained 2 days later after the patient had admitted in a mushy voice that he had been a "naughty boy while on liberty." The EEG was composed of 12 to 14 per second activity ; Bogans test for alcohol was estimated as 1.5 mg./cc. of blood. His picture at this time, although similar in contour and design to the previous one, was poorly organized, disconnected, and linearly perserverative. Within 10 minutes after drawing the picture he became unaware of the environment. Corneal stimulation resulted in no responses ; there was no withdrawal from pin prick or deep pressure.

In vascular lesions that do not involve the visual apparatus, the picture production shows a generalized distortion and simplicity of pattern (Figure 13, left).

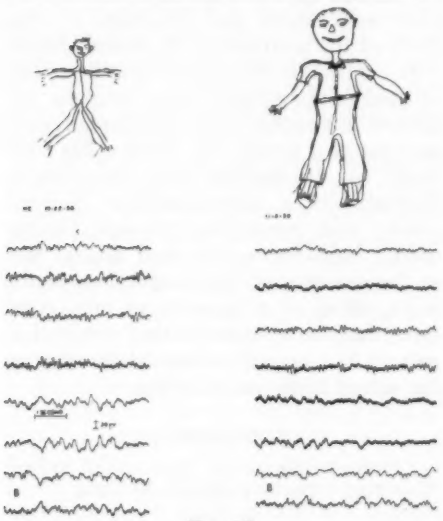


FIG. 13

ACUTE CEREBRAL VASCULAR ACCIDENT (LEFT). MODERATE RECOVERY (RIGHT). NOTE SKELETAL DESIGN IN EACH FIGURE.

An example is afforded by a 35-year-old man who had a sudden onset of right hemiparesis and a voluble jargon aphasia. There was difficulty in comprehending the written or spoken word. Only occasionally was a right-left confusion observed. Dynamically the right face was flat. In sensory function the major defects were in position sense, two-point discrimination, stereognosis and failure to resolve double simultaneously applied cutaneous stimuli. There was a Babinski sign and hyperactive deep tendon reflexes on the right. His picture was formed from a stick figure with unusually applied digits. The EEG showed high voltage, 3 to 5 per second waves dominating the left brain output.

At the time of the drawing on the right of Figure 13, the patient was able to walk. When his speech became garbled he was now able to write his wants. He proved to be much more effective on this visit. Although his picture was better organized, he still utilized the transparency technique. The slow output of the EEG was much reduced in prominence.

From the data it appears that the picture drawing fluctuates between a second and higher order symbol as earlier defined. The picture produced, however, appears to be more of a higher order symbol than a pure representation. This derives from the fact that usually in only one or two elements of any given picture in this series, is a dominant characteristic of the individual portrayed. Also it appears that classical representation requires an innate compulsion to render, or reproduce, the object in a "perfect" form, or as an abstraction of the perfect form. The crudest drawing and the most acclaimed picture are symbols with but varying qualities of perfection of rendering.

SUMMARY AND CONCLUSION

My thesis is that the more related the replication is to the sense data, the lower is the order of symbolization. Consequently, irrespective of the complexity and meanings of the subject matter, as perfection in rendition is accomplished, the lower the order of symbol portrayed. In this sense the natural development of artistic forms is in non-representational geometric and surrealistic symbols. This logic induces a paradoxical situation. Are the scribbled delineations of the child, and anthropoids, high order symbols ? Certainly the child's scribbles do not have representational value. This potential paradox is resolved when it can be demonstrated that the scribbling has very little, or no, *second order* symbol value *to the child.* This major point is elucidated by asking the child to point out, after the scribbling, even if he has named anatomical parts during the production, the various components. This is hardly ever accom-

plished correctly, even when there is only little time delay from the scribble to the interrogation. If the time delay is long and/or the picture rotated, the child cannot point out the body parts he has named in his scribbled display, but he can easily do this from a conventional two-dimensional manikin. As a consequence it appears that the scribble constitutes a mark without particulate, or general, symbolic value.

Further evidence that the picture drawing is an individual symbol of a person, and not necessarily a representation of the body image concept, is the fact that irrespective of the vicissitudes of brain function, in general, the major elements are faithfully reproduced, even when the composition is unilaterally or generally disturbed.

The specific, asymmetric distortions are a further point in favor of this concept. It seems very clear that these distortions when present are a manifestation of a disturbance in the instrumentalities; that is, the visual field is lost to the individual and consequently he displaces the elements in the blind field. A fruitful study might be the attempt to discover why some individuals with visual field defects do NOT portray asymmetric picture drawings.

It is of course, possible to discuss the presented data in the fabric of the *body image concept*, and its distortions. This, however, implies a one-to-one correspondence between the depictions and the body image concept. From my material, this direct correspondence is difficult to demonstrate. However, if material such as that comprising Figure 2 could be amplified and confirmed, the direct relation between body image concept and depiction might be demonstrated. Irrespective, it is quite clear that the body image concept and the body depiction complex is not a process of physiological proprioception in the sense of spatial orientation of body parts. This derives from the fact that the blind child between the ages of 7 and 8 years (personal observations) is unable to present compositionally correct graphic or plastic forms of the human figure. As a consequence it appears that the graphically depicted human form is in high probability a visually learned and controlled symbol operation with only occasional perturbatory accretions emanating from volitional or non-volitional expressions of annoying parts or conflictual feelings. Consequently, a direct operational approach through symbols has been emphasized and employed in this study of the portrayal of the human figure.

In conclusion, it is shown that by means of learned processes, basic symbols are formed that appear to be a conservative expression of a person. An attempt has been made to demonstrate that this symbol fluctuates in a representational (second order) and non-representational (higher order) behavior matrix. And finally, that in the presence of crippling lesions of the brain, either of a transient, or more fixed type, that the symbol is either distorted in part or in a general manner, depending on the nature of the brain lesion.

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SUBLIMINAL AND SUPRALIMINAL INFLUENCES ON DREAMS[1]

CHARLES FISHER, PH.D., M.D.[2]

This paper will report an attempt to investigate the role of several types of incidental or indifferent perceptual stimuli in the formation of dreams and to elucidate some of the cognitive processes involved in the incorporation of such stimuli into the dreams. The recent work on subliminal registration, or more especially the replications and confirmations of the classical Poetzl experiment(1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 14, 15), has shown that subliminal stimuli are utilized in the formation of the manifest content of dreams. This work indicates that there are aspects of perception that are related to the drives, unconscious wishes and primary thought processes, and contrary to psychoanalytic and other theories, perception as an ego function is not exclusively concerned with adaptation and reality testing.

There is one important place in Freud's theoretical structure where he came close to dealing with perception in these latter terms and that is in his formulation of the nature and function of day residues(7). Although he did not discuss day residues in relation to perception, he did stress the significance of *transient, unnoticed* or vaguely attended to impressions of the day in the construction of dreams. He came to the conclusion that dreams have a preference for taking up *unimportant details* of waking life. The wider implications of Freud's astute observation have recently begun to be recognized and are leading to the investigation of the influence of indifferent impressions, not only on the thought processes of altered states of consciousness, such as the dream or hallucination, but also on thought in the waking state.

When speaking of day residues, Freud freely intermingled the terms, trains of thought, impression, experience, idea, memory, *etc.* He did not distinguish between these various mental processes and the external perceptual events that accompany them. It has been proposed that the concept of the day residue needs to be expanded to include not only preconscious trains of thought, ideas, memories, *etc.*, but also the *sensory* events that surround these psychic events and, for purposes of dream formation, especially the subliminal stimuli that are registered while they are going on. It is the sensory material, both preconscious and conscious, that is registered as memory trace, that appears to become the raw material for the dream and is utilized in the process of translation of the dream thoughts into plastic visual or other sensory images.

What exactly did Freud mean by an indifferent impression? He stated,

> The unconscious prefers to weave its connections around preconscious impressions and ideas which are either indifferent and have thus had no attention paid to them, or have been rejected and have thus had attention promptly withdrawn from them(7).

Although Freud spoke of indifferent impressions as those to which no attention had been paid or from which attention was quickly withdrawn, he never clearly distinguished between impressions which reached awareness and those which remained entirely out of consciousness. Most of the types of impressions, experiences, trains of thought, *etc.*, that he spoke about were consciously experienced, however fleetingly. Freud did not further pursue the leads suggested by his off-hand remarks about indifferent impressions nor consider the possibility that different kinds of incidental registrations might have different roles in the formation of dreams.

The following is a tentative classification of incidental registrations. First, there is the totally subliminal, incapable of entering consciousness by virtue of weak stimulus conditions. With this type there is no question of attention being involved because no amount of attention will bring about aware-

[1] Read at the 115th annual meeting of The American Psychiatric Association, Philadelphia, Pa., Apr. 27-May 1, 1959.

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ness ; nevertheless, registration and formation of a preconscious memory trace are assumed to take place. Second, there are percepts which are capable of entering consciousness but do not do so because attention is not paid to them. Third, there are incidental impressions that reach consciousness fleetingly, that are weakly cathected with attention or from which cathexis is quickly withdrawn. Fourth, there are supraliminal, focal, fully cathected perceptions which fall within the central focus of attention. Such supraliminal, focal percepts may or may not be indifferent, depending upon their meaning, intensity of affective charge and other conditions.

The completely subliminal stimulus may be considered an extreme example of what Freud called "an indifferent impression." Although the completely subliminal stimulus has been extensively investigated, the role of the supraliminal, focal stimulus in dream formation has not.

As I have stated, the present pilot investigation represents an attempt to study several of the types of visual registrations and percepts associated with day residues and to differentiate their respective roles in the formation of dreams. Specifically, the attempt was made to study the effect of the simultaneous presentation of a subliminal stimulus and a supraliminal, focal stimulus on subsequent dreams.

METHOD

Two visual stimuli (Fig. 1) were exposed

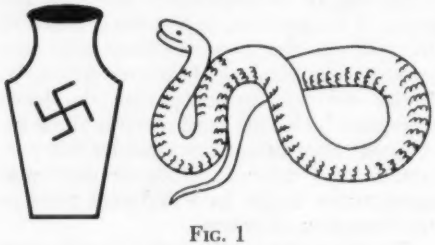

FIG. 1

simultaneously through a tachistoscope. For 7 subjects, the stimulus picture shown on the right was made totally subliminal by drawing it in very light pencil lines while the stimulus picture on the left was made supraliminal by drawing it in very heavy inked lines. For 4 subjects, the reverse procedure was carried out ; that is, the vase and swastika were made subliminal and the snake was made supraliminal. When either version of this slide is tachistoscopically exposed at 1/100 second, the subliminal stimulus cannot be discriminated, the recognition threshold for it being about ½ second. The supraliminal stimulus, however, is normally discriminated after one or two exposures at 1/100 second. It was assumed that the 2 stimuli become part of the sensory events incorporated into and forming a part of the complex experience we call a day residue.

The essential method used was the combined dream-imagery technique previously described(4). Briefly, the stimulus picture was exposed for 1/100 second at successive intervals until the vase, and particularly the swastika upon it, was successfully discriminated. After each exposure, the subject was required to draw what he had seen and to describe it verbally. The subject was then requested to bring in any dreams that he had during the night. The next day he reported his dream, made drawings of its significant pictorial elements, and then associated to the dream as freely as he was able. Following this, the stimulus picture was exposed for 1/100 second again and a series of 5 or more free images elicited. The subjects verbally described and made drawings of them. The stimulus was then re-exposed at successive intervals starting at 1/100 second, gradually increasing the time of exposure until the threshold of discrimination for the snake was determined. Finally, the subject re-examined his drawings for similarities to and correspondences with the stimulus picture.

It will be noted that both of these stimuli carry a highly affective charge and that they are sexual symbols in the psychoanalytic sense. The swastika on the vase could be thought of as an American Indian decoration but I was aware of the possibility that it remains for most people a highly charged configuration.

Of the 11 subjects used, 8, all male, were residents or other physicians of the experimenter's acquaintance ; 2 were female patients on the Psychiatry Ward of Mount

Sinai Hospital, and one was a paid subject, by profession an actor.

RESULTS

I shall first present 2 dreams which occurred following the tachistoscopic exposure of the slide in which the vase was supraliminal and the snake subliminal.

Subject A had the following dream :

I was in a totalitarian prison camp in a room which they were trying to wire so they could listen in. There was a red-headed guy sitting in a chair. His name was Fisher. His arms were bare ; they were shortish and bound down on the arms of the chair with Scotch tape. He did not seem too frightened. From his elbows to his hands, his arms were not as long as they should be. I said to him, "I'm resigning tomorrow from the concentration camp. Now I'm going to take my bullwhip," and I made a threatening gesture at him.

Associations : The Fisher in the dream was not you but an old friend of mine. I liked him because he was broad minded, and racially tolerant. Fisher's hands were not right. All that it took to hold his arms down was Scotch tape because they were so weak. I used to Scotch tape my own fingers together and then try to break loose in order to test my strength. The whole dream gives me a feeling of idiocy. I never in my life held a bullwhip. It was like acting in a play, as though Fisher knew that I was not threatening him ; he did not appear frightened.

The subject made a drawing (Fig. 2) depicting himself threatening Fisher with the bullwhip. His image of himself was one of power and strength, as indicated by the very large biceps on the arm holding the bullwhip. He remarked that "the bullwhip had some coils, was black and made of some kind of *living stuff* like catgut. I think it's *snake* or *snake hide*. I've seen rattlesnakes of that consistency."

FIG. 2

His associations to the remark, "I am resigning tomorrow from the concentration camp," were as follows : The phrase, "concentration camp" was a play on words related to the idea that I forced him to *concentrate* on the screen, and on his dreams. The idea of resigning had to do with his resentment at being in the position of a subject and his irritation at being forced to dream. The bed that was wired for listening in was associated to his fear of being forced to reveal his thoughts, and made him think of Orwell's "1984" and Big Brother. He stated that the Fisher in the dream must represent me.

During the re-exposure period, the subject compared his dream drawings with the stimulus picture. The subject felt that the concentration camp setting of the dream had been evoked by the swastika. He was extremely impressed by the resemblance between the bullwhip and the snake and by the fact that he had described the whip as made out of snake hide.

Interpretation : The latent content of the dream centers around the subject's unconscious conflicts having to do with the idea that he is weak or in a weak position by virtue of his status as an experimental subject and that I am strong and will dominate over him, force him to concentrate, to dream and to reveal his secret thoughts.

The dream expresses his aggressive wishes to reverse roles, to be in the strong dominating position and to place me in a submissive, weak one. The swastika stimulated a train of preconscious dream thought having to do with a concentration camp, representing his unconscious picture of the laboratory and the hospital. The central part of the dream relates to the red-headed man named Fisher, an extremely thin disguise for me, whom the subject threatens with a bullwhip. The idea of resigning expresses the subject's wish to run away from his role as a subject. It seems obvious that the subliminal percept of the snake was transformed in the dream into the bullwhip made of snake hide. The idea of strength and weakness and domination and submission is depicted in the description of the arms of both parties to the conflict. Fisher's

arms were weak and deformed, bound down with Scotch tape, while the image of the subject was that of a powerful figure with bulging biceps and the threatening bullwhip. Although the subject's aggression in the dream is quite apparent, it is disguised and toned down by his giving the dream scene a play quality, by making Fisher appear not to be frightened, by tying his arms down with Scotch tape that can easily be broken.

Following exposure of the same stimulus, Subject B had a dream in which the subliminal snake appeared to be transformed in the manifest content of the dream into the arm and hand of a man. The drawing of this image is shown in Fig. 3. During the re-exposure period,

FIG. 3

the subject stated that the hand and arm on the right resembled the snake's head and proximal part of the body and he called attention especially to the correspondence between the thumb and the lower jaw of the snake. The analysis of the dream suggested that the arm and hand had symbolic phallic meaning and had assumed some of the pictorial characteristics of the snake. In the content of this dream, there were direct references to Jewishness and anti-Semitism.

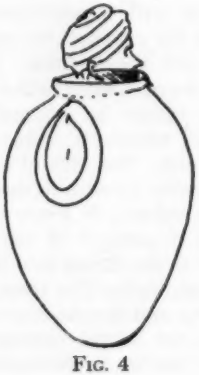

FIG. 4

It has been noted that Subject B gave evidence of symbolic phallic displacement to the arm and hand. This tendency to displace to the extremities was shown even more clearly in a free imagery experiment done subsequent to the dream experiment, utilizing the same stimulus at a time when the subject did not yet know the nature of the stimulus.

Fig. 4 was the subject's first image, showing one of the 40 thieves of Ali Baba hiding in a jug. Later, during the re-exposure period, the subject felt that the coils of the turban were transformations of the coils of the snake.

The second image (Fig. 5) was described

FIG. 5

as an amphora with smoke coming out. The smoke became transformed into a genie. Note the sinuous, snake-like structure of the smoke. The subject stated that this image reminded

FIG. 6

him of a mermaid which he used to draw a lot.

Fig. 6 represents his image of the mermaid. He noted particularly the mermaid's scales,

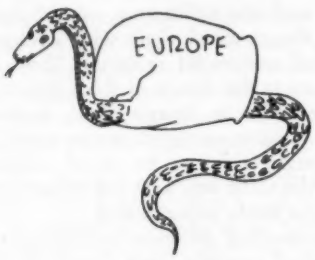

FIG. 7

which made him think of a snake, and he made the drawing shown in Fig. 7. He said that he used to make a lot of anti-Nazi drawings and this reminded him of a political cartoon. A snake is shown crawling through the vase, representing Europe, and bursting through its base. On the snake's head is a swastika. The cartoon illustrates the rape of Europe by the Nazis.

In this experiment, we see the gradual striking emergence of the percept of the snake, beginning with the coils of the turban in the first image, the sinuous, snake-like formation of the smoke in the second, the mermaid's scaly tail in the third, and finally, the almost photographic emergence of the snake in the last image. Aside from the breakthrough of the percept in this final image, the snake never appeared as such in the images or the dream, but was displaced and distorted in disguised ways to either the arms or the legs.

The following generalizations can be made about these 2 experiments :

1. In both, the subliminal snake did not appear as such in the dreams but was transformed, in the first instance into the bullwhip made of snake hide and in the second into the arm and hand. In both instances, the transformed image took on formal, pictorial properties of the stimulus picture ; for example, the shape and composition of the bullwhip, and the formation of the hand which resembled the snake's head. Finally, in both dreams, the subliminal snake appears to have become associated with the most significant, most deeply repressed drive, wish-fulfilling aspect of the latent content of the dream.

2. In contrast, part of the supraliminal stimulus, namely, the swastika, did not appear in the dreams in *image* form as did the subliminal snake, but in both instances activated preconscious trains of thought. In the first dream, these related to a concentration camp, to ideas of force, Big Brother, being spied upon, *etc.* ; in the second dream, to trains of thought relating to Jews, such as a verbal comment about anti-Semitism.

3. Although the transference aspects of the dream stimulated by the experimental situation are important factors in explaining the sexual and domination-submission themes, it was entirely possible that such content was reinforced by the nature of the two stimuli, namely, their meanings as male and female symbols. That such was the case is suggested by the data of the imagery experiment reported. Here, the symbolic sexual meaning of the vase and the snake appear to have been unconsciously cognized, the final image becoming a metaphorical representation of, "the rape of Europe."

The following dream was elicited after the exposure of the *reversed* stimuli, *i.e.*, in this instance the snake was supraliminal and the vase and swastika were subliminal.

Subject C dreamed :

I was at a dance in a very large hall. I found an object on the floor. It was either a brooch or a small antique. Dr. A was with me. As I was looking at the brooch, little mites came out of it and embedded themselves in the skin of my fingers and I became quite frightened. Wherever I would touch my hand these mites would embed themselves in my skin.

Associations : The dream was concerned with a fantasy punishment for forbidden sexual activities. The brooch appeared to be a female symbol and the mites that came out of it were associated with ideas of phallic contamination or injury as punishment for his sexual activities, with displacement to the fingers. This displacement was activated by the fact that the subject had recently developed a severe contact dermatitis on his fingers.

Fig. 8 shows on the left, the subject's drawing of the brooch. It appears to be a distorted,

FIG. 8

flattened out transformation of the vase. If the brooch were stretched out and down it would very closely approximate the outline of the vase which I have superimposed in dotted lines upon it.

The drawing on the right represents one of the mites. Although it does not bear too striking a resemblance to the swastika, it does contain some of its formal elements and may have been derived from it.

The subject made another drawing (Fig. 9)

FIG. 9

showing his hand with markings indicating the embedding mites. The markings on the middle finger contain clear-cut elements of the subliminal swastika, supporting the contention that the fleas represent a transformation and distortion of the subliminal stimulus.

In this experiment, the subliminal vase and swastika seem to have appeared in the manifest content of the dream in image form and associated with the repressed, drive organized, wish-fulfilling aspect of the dream in the same manner as the subliminal snake did in the first 2 experiments described. However, the supraliminal snake did not appear to bring about the same effects as the vase and swastika in the first two experiments when they were supraliminal. As a matter of fact, there was no indication of the presence of the snake either directly or in disguised or distorted form in the manifest content of the dream. It is possible, however, that it influenced the dream indirectly and by virtue of its symbolic meaning had something to do with the latent sexual content of the dream.

After the exposure of the supraliminal snake and the subliminal vase, Subject D had a dream which dealt with a Negro and involved anti-racial material. There is no evidence in the dream of the appearance of the swastika in image form. Instead, it seems to have activated preconscious trains of thought relating to racial matters in much the same way as it did when the stimulus was made supraliminal.

A somewhat different utilization of the subliminal swastika was shown in the results of 2 other subjects who were exposed to the reversed slide.

Subject E dreamed :

I was on the 40th floor of some building and was very scared of being up there. It did not seem as safe as the ordinary 40th floor of a building.

After reporting the dream, the subject wrote the words, "fourtieth flour" as shown in Fig. 10. It will be noted that both the words "four-

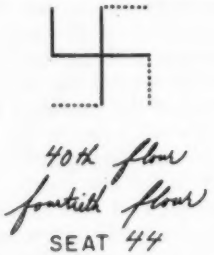

FIG. 10

tieth" and "flour" were misspelled. By this misspelling, both the words were made to contain the word, "four." During the re-exposure period, the subject himself spontaneously pointed out that the swastika is made up of 4's as indicated in the figure.

Part of a second dream went as follows : "Several of us were going to a legitimate theatre. I had Seat 44." Again, during the re-exposure, the subject felt that the 44 was derived from the swastika.

Subject F also transformed the subliminal swastika into "fours" in 2 dreams. One was about a shabby clock with "a 4 o'clock look." In these instances, the 4's represented transformations of the swastika.

As I have noted, in the dreams so far reported, when the snake was made *supraliminal*, there was no evidence of its emer-

gence in either primary or secondary process form in the manifest content of the dream. However, in 2 of the dreams of Subject E, indirect evidence of the influence of the supraliminal stimulus could be detected. The subject had the following dream :

"There was a group of people standing around a guy who was going to open a *wall* safe and when he opened it *secrets* would come out. Everything that had been built up would be destroyed like the scandal in Connecticut where 6 men raped a teen-age girl and the mayor of the town committed suicide. They were all around for the opening. Then I was running out of the building, making a mad dash." The rest of the dream had to do with the subject's breaking into an old New England house, being pursued by and hiding from some man who was after him.

Associations : The old New England house made the subject think of his grandparents' farm house where he used to spend his summers when he was a small child. One summer when he was about 5, his uncles were cleaning out a well and killing snakes that were in it. One of them picked up a snake and threw it at him. He screamed and ran into the house. Ever since this traumatic experience, the subject has had an intense fear of snakes.

Interpretation : The evidence suggested that the group of people standing around waiting to open the wall safe and let the secrets come out was an indirect representation of the memory of his uncle removing snakes from the well and throwing one at him. The running away in a mad dash in the dream related to his running to the house in terror when his uncle threw the snake at him. It is of interest also that the "secrets" that were to come out of the well were associated with the scandal in Connecticut where 6 men committed rape on a teen-age girl. The subject's memory of his uncle and the snake was a perfectly conscious one, but was, in psychoanalytic terminology, a screen memory, that is, it screened a repressed group of fantasies that connected with his homosexual fears and wishes relating to the uncle. It may be noted that this subject had overt homosexual tendencies.

DISCUSSION

The results of the experiments reported confirm and extend Freud's formulations about the nature and function of indifferent impressions in dream formation. They can best be understood in terms of certain psychoanalytic propositions about the structure of memory organization. Rapaport(13), has suggested that memory schema are organized into constellations layered in depth. The deepest level of repressed memories are organized around drives and have the quality of unconsciousness. This drive organization of memories is distinguished from a more superficial constellation, in terms of depth, which can be called the "conceptual organization of memories." This latter organization carries the quality of preconsciousness and is readily capable of becoming conscious. The drive organization of memories functions with mobile cathexes and primary process thought mechanisms, whereas the conceptual organization utilizes neutralized energy and functions according to the secondary process. Between the drive and conceptual organizations of memory it is assumed that there are transitional constellations which partake of the properties of both organizations.

The manner in which the perceptual stimuli were incorporated into the dreams in these experiments was highly complex and appeared to involve a number of factors. I initially thought that the subliminal stimulus resonated with the drive organizations of repressed memories, was subjected to primary process transformation and appeared in the manifest content of the dream in image form in relation to the latent unconscious wish fulfilling aspect of the dream, whereas the supraliminal stimulus appeared to activate preconscious trains of secondary process thought, direct derivatives of the stimulus emerging in the dream in verbal, conceptual form. This formulation turned out to be only partially correct and a good many exceptions to it developed. At least 3, and probably more factors influence the manner in which the stimuli are handled by the dream work : 1) The degree of indifference of the stimulus, *i.e.*, whether it is subliminal or supraliminal ; 2 the meaning content of the stimulus ; and 3) the personality characteristics, conflicts and defensive operations of the subject.

1. *The role of the degree of indifference of the stimulus.* A stimulus, such as the swastika, when made supraliminal, generally becomes registered as memory trace in the conceptual organization of memory. There, it activates preconscious trains of thought

which are expressed in secondary process terms, mostly in verbal form, as opposed to representation through images. It appears to become recruited to reality attuned memory schema expressed in rational thought, and, therefore, is less suitable for use in expressing the drive, and unconscious, wish-fulfilling aspect of the dream. Thus, there appeared in the manifest content of the dream, direct derivatives of the swastika having to do with Nazis, concentration camps, prisons, barracks, Jew-Gentile, and other racial conflicts. These derivatives were logical and direct and of the same kind that one might have in the waking state.

In the majority of the experiments, both the snake and the vase and swastika, when made *subliminal,* appeared to resonate with the drive organization of memories, were more readily cathected by mobile id energies and unconscious wishes and more subject to primary process transformation. As opposed to the supraliminal focal stimulus, they appeared in the dream as indirect derivatives and in the form of visual images. Thus, the transformed image of the subliminal snake was used in the direct representation of a wish fulfillment as in the dream of the snake-like bullwhip. In the case of Subject C, the subliminal vase and swastika were transformed into the brooch and the embedding mites. Such derivatives of these stimuli are not of the kind that would ordinarily develop in the conscious waking state.

Although the stimuli, when made subliminal, behaved for the most part as I have indicated, there were exceptions. The subliminal stimulus may be recruited either into the drive or conceptual organization of memories or into constellations that partake of both organizations. At the most primitive level, a fragmented derivative of the memory trace of the subliminal stimulus may appear in image form in the dream. In these instances, some formal pictorial or geometrical element of the stimulus will emerge divorced from the original meaning of the stimulus with a new meaning assigned. A good example would be the dream reported in which the swastika was transformed into the number 4, or the dream in which it emerged as the embedding mites. On a somewhat more complex level, the subliminal snake may appear in image form, the image modelled on the formal properties of the stimulus, but with certain conceptual elements added, for example, the bullwhip which had the shape of a snake but was said to be made of snake hide. The emergence of such an image implies some unconscious process of cognition so that the subliminal snake was recognized for what it was. At a still more complex level the subliminal stimulus may activate the conceptual organization of memories with the emergence of direct secondary process forms of thought; for example, the dream about the Negro. In this instance, we have to assume that unconscious recognition of the meaning of the swastika took place and that associated secondary process derivatives relating to racial conflicts appeared in the dream.

2. *The role of the meaning content of the stimulus.* In the dreams of the 4 subjects who were exposed to the supraliminal focal snake it became clear that the latter did not behave in the same way as the swastika when it was supraliminal. That is, it did not appear to have activated preconscious trains of secondary process thought. As a matter of fact, there was no evidence that it found direct representation in the manifest content of the dream in any form. *It seemed that the fact that the stimulus was a snake was more important than the fact of its being supra- or subliminal.* Since the snake is a highly charged phallic symbol, it is suitable to resonate with the drive organization of memories and latent unconscious wishes. There was, however, evidence in several of the dreams of Subject E that it did play a significant role in stimulating their latent content, although its influence was complex and indirect. It appears to have aroused certain conscious screen memories, the latent content of these screen memories then being indirectly, in a disguised and distorted form, represented in the dream. The traumatic screen memory concerned with snakes attained representation in one dream in the form of the wall safe and the secrets.

To summarize the rather conflicting da-

ta that I have described : In all the experiments, the swastika when made supraliminal, if it influenced the dream, did so by activating the conceptual organization of memory and appeared in secondary process form, never in primary process image form. When made subliminal, the swastika in some instances activated the drive organization of memories and in some, the conceptual organization. The snake, on the other hand, when made subliminal, always appeared to activate the drive organization of memories. When it was made supraliminal, however, it did not appear to activate the conceptual organization of memories. It did not find direct representation in the manifest dream either in verbal or pictorial form, but when it did influence the dream did so in a highly indirect manner, as in the instance of the activation of a screen memory.

3. *The role of personality characteristics, conflicts and defensive operations of the subject :* No systematic attempt has been made to investigate these factors but individual variations probably play a significant role, as Shevrin and Luborsky have recently demonstrated in their investigation of variations in the utilization of the defense mechanism of repression, and the influence of such individual differences on the results of the Poetzl experiment(15). The specific conflicts of the subject may also influence the manner in which various types of perceptual stimuli are utilized. For example, Subject E's reaction to the supraliminal snake may well have had something to do with the fact that he actually had a phobia for snakes.

Conclusion

This is a preliminary, exploratory, pilot investigation and the data have not been evaluated by objective methods. Although it would be difficult to do this, we plan to make the attempt.

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DIFFERENTIAL RESPONSES IN YOUNG VS. OLD ANIMALS TO TRAINING, CONFLICT, DRUGS AND BRAIN LESIONS [1, 2]

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PRELIMINARY OBSERVATIONS

One female and 5 male kittens, 4 to 5 months old, and 1 male and 5 female rhesus monkeys, aged about 2 years, were rated daily for 8 to 12 months as to their individual and social behavior, their capacity to solve problems of discrimination and short-term memory presented in a specially designed apparatus, and their reactions to depressant and ataractic drugs. Our methods and apparatus were described in detail in previous reports(1, 2). In the present study, the animals were required to press the correct one of two levers in response to bell or light signals, to alternate between levers when no signal was given, and then to combine these patterns of response. In addition, the monkeys were required to discriminate direct object stimuli, delayed spatial cues, and pattern relationships in a modification of the Wisconsin General Testing Apparatus(3). The criteria and scales employed had been proved to be highly reliable in earlier studies(1).

Induction of Experimental Neuroses. As described previously(2), this was accomplished by subjecting the animals at irregular periods to 2 to 10 low-amperage high-voltage condenser shocks at the time of food-taking over a period of 3 to 15 weeks

Cerebral Lesions. The neurotic kittens were observed for 11 to 13 months and the monkeys for 14 to 18 months, after which all of the animals were operated to produce the following bilateral lesions: in cats, 4 medial amygdalectomies and 2 mediodorsal thalamic ablations; in the monkeys, 3 total amygdalectomies, 2 frontal (Grantham equivalent) and 1 temporal ablations. The thalamic lesions were produced by Horsley-Clarke stereotactic electrolysis; the others, by open field operations.

RESULTS

Spontaneous Behavior. As can be seen from Table 1, the kittens took longer than older cats to achieve comparable ratings in establishing friendly relations with the experimenters, exploring the laboratory, feeding in the experimental apparatus, and trying the levers for activating conditional signals and securing the food rewards. In contrast, the adaptation of the young monkeys was approximately as rapid as that of the older pre-adolescent and adult animals when rated on comparable scales.

Lever Pressing. Table 1 indicates that the kittens took almost 5 times as long as older cats (average 110 days as compared to 21) to learn to press levers for food rewards 25 times in a 40-minute period. Similarly, the 6 young monkeys took an average of 66.5 days as opposed to means of 19 and 22.5 days for the older control groups.

Discrimination. Table 1 also shows that the young cats (a) took almost 3 times as long to acquire the initial auditory-visual differential responses and (b) performed with an accuracy of only 60% as opposed to the 80% or better of the older cats. The young monkeys also learned such discriminations more slowly than did adult monkeys (18 as opposed to 15 days) but about as well as the pre-adolescents. All three groups performed with comparable accuracy.

Neuroses. As the experimental neurosis generalized, all animals developed hyperreactivity to stimuli, tics, tremors, generalized phobias, disruptions of learned performance, resistance to being brought to the laboratory and, in the monkeys, digestive,

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TABLE 1

DAYS REQUIRED FOR ADAPTATION TO LABORATORY ROUTINE, CONSISTENT LEVER PRESSING BEHAVIOR AND LEARNING

Subjects	Adaptation to laboratory routine	Consistent Pressing of Levers *	Learning **	
			Time	Average Percentage of Accuracy
Adult Cats n=65	Range 5-40 Mean 12	Range 1-70 Mean 21	Range 5-45 Mean 20	80% or better
Kittens n=9	Range 20-70 Mean 44	Range 30-180 Mean 110	Range 40- 90 Mean 55	60%
Post-Adolescent Monkeys n=35	Range 5-30 Mean 11	Range 1-35 Mean 19	Range 5-30 Mean 15	80% or better
Pre-Adolescent Monkeys (Est. 32-33 mos.) n=13	Range 5-30 Mean 10.5	Range 1-40 Mean 22.5	Range 5-40 Mean 19	80% or better
Pre-Adolescent Monkeys (Est. 24 mos.) n=6	Range 5-30 Mean 11	Range 20-90 Mean 66.5	Range 5-35 Mean 13	80% or better

* Days between the initial lever-press (required movement less than .10 inch under pressure of less than 1 ounce) for a food reward to correct manipulation of both levers 25 times within 40 minutes. No discrimination is involved in this step.

** For simplicity, only the discrimination between bell and light signals is included here.

respiratory and other dysfunctions which persisted despite 7 to 17 months of retraining. However, in contrast to the adults of both species, the young animals continued to take food in the apparatus if it were made freely available and showed only mild inhibitions of their usual play and social behavior; moreover, the monkeys in particular retained their capacity to master discrimination techniques in a different apparatus.

Effects of Brain Lesions. Soon after amygdalectomy and until they were sacrificed 16 to 18 months later our kittens pursued other animals, regardless of sex, species or opposition, and persisted in mounting them for as long as two hours if permitted to do so; in contrast, this hypereroticism generally disappeared within 6 to 8 months in a control group of adult amygdalectomized cats(4). The 4 young monkeys with amygdaloid or temporal ablations were similarly hypererotic, whereas those with frontal ablations were more diffusely overactive. However, in none of the young animals did the cerebral lesions immediately modify any established neurotic pattern; indeed, only after more than a year of intensive postoperative retraining was a modest decrease in hyper-reactivity and increased adaptation to the experimental apparatus effected. During the subsequent 13 to 16 months the young monkeys showed a reduction in startle and phobic responses, lessened hyper-reactivity, and a moderate increase of social interactions with their cage and colony mates; nevertheless, stereotyped motor behavior and apprehension in the experimental apparatus persisted, and the animals failed to relearn problems they had previously mastered.

Effects of Drugs. Reserpine in daily doses of .05 to .15 mg. and chlorpromazine in daily doses of 18 to 30 mg. were administered to our neurotic animals before and after operation. Neither drug produced more than a minimal and transient diminution in neurotic behavior in the kittens,

whereas somewhat marked and persistent benefits had been observed in 12 of 36 adult animals(1). Both young and old monkeys were even less amenable to drug therapy than were the cats.

Conclusions

A preliminary study of 6 kittens and 6 rhesus monkeys, approximately two years old, indicated that:

1. The kittens as compared to older cats adapted less well to laboratory routine and learned tasks of lever-pressing and audio-visual discrimination more slowly;

2. The young monkeys adapted to laboratory routine as well as the older ones but took more time to master the lever-pressing; on the other hand, they learned a series of discrimination problems as quickly as did older pre-adolescents though again somewhat more slowly than adults;

3. The young animals readily developed neurotic patterns under the stress of adaptive conflict but these reactions, though resistant to 7 to 17 months of retraining, were much less generalized than those in adult controls;

4. Lesions in the amygdaloid and frontal areas induced heightened sexuality and general activity level respectively, but, despite 16 to 25 months of postoperative retraining, there was no (in cats) or little (in monkeys) amelioration of neurotic patterns in the young as compared with older animals;

5. Reserpine and chlorpromazine also produced only minimal and transient effects on the experimentally induced neurotic behavior.

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RAPID URINE COLOR TEST
FOR IMIPRAMINE (TOFRĀNIL, GEIGY)

Mix 1 cc urine with 1 cc test solution*, shake gently and read promptly against color chart :

Daily Drug Dose:

25-50 mg.	50-75 mg.	75-150 mg.	150-250 mg.
+	++	+++	++++

*Test solution consists of : 25 parts 0.2% potassium dichromate solution
25 parts 30% sulfuric acid
25 parts 20% perchloric acid
25 parts 50% nitric acid

Absence of green color indicates a negative test.
Initially purple color, rapidly fading and followed by green color development means simultaneous presence of some phenothiazine drugs and Tofranil.
In the presence of large amounts of phenothiazine drugs, a more persistent purple reaction may be seen. In this case add one more cc of test solution, or perform the test immediately with 1 cc of urine and 2 cc of test solution for reliable demonstration of Tofranil.

CLINICAL NOTES

A RAPID URINE COLOR TEST FOR IMIPRAMINE (TOFRĀNIL, GEIGY): SUPPLEMENTARY REPORT WITH COLOR CHART

IRENE S. FORREST, PH.D., FRED M. FORREST, M.D., AND AARON S. MASON, M.D.[1]

In a recent report on a new reagent for the demonstration of urinary imipramine (1), we emphasized the importance of an objective test for actual drug intake, especially in the case of depressive patients who are frequently reluctant to ingest any type of medication.

The inexpensive test solution which may be prepared by any hospital pharmacy or laboratory, consists of the following:

25 parts 0.2% potassium dichromate solution
25 parts 30% sulfuric acid (by volume)
25 parts 20% perchloric acid (commercial product)
25 parts 50% nitric acid (by volume).

The test is performed by placing 1 cc of urine in a test tube, adding 1 cc of test solution, shaking gently to obtain a homogeneous mixture, and reading immediately against the color chart. Prompt readings are especially necessary in the lowest dosage range (25-50 mg. Tofrānil daily) since the resulting pale olive color is of limited stability (15-25 seconds); higher drug doses yield color complexes of increased stability and color intensity, persisting for more than 60 seconds at the highest dosage level seen (250 mg. per day).

The color chart was compiled from over 1000 urine specimens containing Tofrānil, alone or in combination with other drugs. Approximately 250 determinations were used for each of the 4 dosage ranges. Each level of the chart represents the average reactions of at least 25 patients tested repeatedly on different days. The 4 color intensities of the chart comprise the pale olive (+) level, corresponding to daily drug doses of 25 to 50 mg., the light green (++) level for doses of 50 to 75 mg., the medium green (+++) level for 75 to 150 mg., and the deep emerald green (++++) level for daily drug doses of 150 to 250 mg. The latter dose was the highest one seen in our laboratory.

Absence of green color indicates a negative test. In all urine specimens containing Tofrānil, alone or in combination with other drugs, not a single false negative test was observed. As reported previously(1), urines containing imipramine and phenothiazine drugs simultaneously, will show an initial purple color reaction which fades rapidly and is followed by the characteristic green Tofrānil reaction. This is true for ratios of imipramine to phenothiazine compounds up to about 1 : 5, and for daily phenothiazine drug doses up to about 500 mg. In the presence of relatively high doses of phenothiazine compounds, *e.g.* in a combination of 50 mg. imipramine with 600 mg. chlorpromazine daily, the initial purple color may not fade within the usual 15 seconds and may camouflage the Tofrānil reaction. In the presence of even higher amounts of phenothiazine drugs, actually all of the active color producing components of the reagent may be exhausted in the reaction with the phenothiazine compound. It is therefore advisable to perform the test in all these instances with 1 cc of urine and 2 cc of test solution to avoid any false negatives. This should be made standard procedure in the presence of daily phenothiazine drug doses of 400 mg. or more.

In 300 control urines free of drugs no false positive tests were encountered. In another series of 300 controls, containing all types of drugs with the exception of imipramine, 4 patients receiving large doses of multiple antitubercular medications showed "trace" reactions, *i.e.* false positive tests, somewhat below the (+) pale olive level of the color chart. This was found especially at peak excretion time of paraamin-

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osalicylic acid, 1 to 3 hours after administration of medication. These reactions differed from the lowest level Tofrānil reactions by appearing with some delay, usually 20 to 40 seconds after addition of the reagent to the urine. Pure aqueous solutions of paraaminosalicylic acid up to concentrations of 1 mg. PAS (sodium salt) per cc of water, showed no reaction with the Tofrānil reagent in vitro, but higher concentrations, *e.g.* 10 mg. per cc, yielded a greenish color similar to the (+) level of the chart after 20 seconds. A small series of phenylketonuric urines[2] which yielded false positive tests with a number of phenothiazine test reagents (2-5) did not yield any false positive, *i.e.* green color reactions, with the Tofrānil reagent, although test colors from orange to pink and purple were seen in these cases. In no instance among the 1.3% false positives encountered in the 300 control urines containing a variety of drugs, did the false positive reactions reach the (++) or higher levels of the chart. In view of this, the possibility of misinterpretations seems rather remote.

It was also found that the Tofrānil reagent could detect decreasing amounts of imipramine and/or metabolites for several days after discontinuation of the drug. In these cases an original (++) level, for instance, was found to drop to the (+) level within one or two days, with traces detectable for several days thereafter. An investigation of the urinary excretion pattern of the drug and the nature of its biological and chemically prepared metabolites is currently in progress.

[2] Phenylketonuric urines were obtained through the courtesy of the Paul A. Dever State School, Taunton, Mass.

A report on false positive phenothiazine tests obtained with these urines is in preparation.

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REVERSIBILITY OF DRUG-INDUCED PARKINSONISM

ROBERT B. CAHAN, M.D., AND DAVID D. PARRISH, M.D.[1]

Symptoms of parkinsonism induced by Thorazine and Serpasil did not return in a majority of tested hospitalized patients after their anti-parkinson drugs were discontinued. Cogentin had been used from 3 to 16 months for symptoms of parkinsonism induced by Thorazine or Serpasil. In preparation for a proposed study of a new anti-parkinson agent, 34 patients had their Cogentin discontinued, remaining on their previously parkinsonizing dose of ataraxic. After 3 weeks only 6 patients had any return of their parkinsonism! After 8 months, none of the other 28 patients had developed parkinsonism. Perusal of the literature in order to ascertain whether this observation had been made and reported revealed only a few suggestive comments[2] but no specific statement.

[1] Norristown State Hospital, Norristown, Pa.

[2] Konchegul, Leon : Med. Annuals of the District of Columbia, Aug. 1958.

Ir an attempt to confirm these observations, Artane and Cogentin were stopped in another series of patients with drug-induced parkinsonism. Only 11 of 49 patients in the new series redeveloped any parkinson symptoms. One of these had been on Cogentin only 18 days, but another patient who had been on the drug for only 23 days had no return of symptoms. Some patients who had been on Artane for over two years had return of symptoms.

Discussion

Thus we have patients demonstrating 3 divisions of parkinsonian sensitivity to ataractic drugs : 1. The group which does not develop parkinsonism even with major amounts of the drugs (*i.e.*, two grams of Thorazine daily) ; 2. Those patients who develop parkinsonism that will not relent even with temporary reduction of drug or an anti-parkinson agent ; and, 3. Those

patients whose parkinsonism can be controlled by temporary reduction of the level of ataraxic or by *temporary* use of an anti-parkinson agent.

There are both practical and theoretical implications to this finding. The majority of patients with drug-induced parkinsonism, after a period, no longer need the anti-parkinson drugs they are receiving. There is a potential saving in side-effects, time, effort, and money in withdrawing all patients with drug-induced parkinsonism after approximately two months of therapy with anti-parkinson drugs, restarting only those who redevelop symptoms. Our finding would indicate that approximately three-quarters no longer need such medication.

The theoretical aspects raise several questions on the nature of drug-induced parkinsonism, obviously different from post-encephalitic or idiopathic forms of parkinsonism which do not relent after treatment. Central synaptic transmission is dependent upon normal acetylcholine-cholinesterase activity. Since all of the recognized anti-parkinson agents are noted to have anti-cholinergic properties, one might speculate that the ataractic drugs temporarily impair the acetylcholine-cholinesterase equilibrium in the neostriatum and paleostriatum, and that this action is reversed by the anti-parkinson agents. Perhaps the anti-parkinson agents facilitate more normal synaptic transmission by increasing the cellular threshold to acetylcholine.

Any hypothesis should predicate the tissue's ability to gain permanent relief from toxic tremor and rigidity when the clinical symptoms are relieved but the toxic agent remains in the circulation. We are now observing the length of time necessary for development of the adaptive mechanism, and considering its mode of action.

RESPONSES OF TREATMENT-REFRACTORY CHRONIC SCHIZOPHRENICS TO CHLORPROMAZINE WITH CONCURRENT ADRENOCORTICAL STEROID [1]

KISIK KIM, M.D.[2]

It is generally accepted that overtly anxious schizophrenic patients are amenable to therapy, and one sign that characterizes the majority of treatment-refractory chronic schizophrenics is the lack of such anxiety.

Based on observations that the blood adrenocortical steroid level is elevated in anxiety states (3, 4), and that adrenocortical function is depressed in chronic schizophrenics (3), it was postulated that adrenal steroids (though apparently not therapeutic by themselves in schizophrenia (1, 2, 5, 6) might "activate" such patients, thus rendering them more responsive to presently available treatments.

This study was carried out to determine whether Aristocort, a biosynthetic adrenocortical steroid, would have beneficial effect on the response pattern of treatment-refractory chronic schizophrenics to chlorpromazine.

METHOD

Ten chronic schizophrenic patients at Norfolk State Hospital were selected on the basis of their records and clinical examinations and were divided into 2 matching groups of 5 patients each : an experimental and a control group.

There were 2 women and 3 men in each group. In the experimental group, the ages of the patients ranged from 37 to 52 years (mean 42.8 years), and length of current admission, from 4 to 25 years (mean 15.4 years). In the control group, the age range was from 33 to 49 years (mean 41.4 years), and current admission length from 10 to 28 years (mean 20.2 years).

The outstanding clinical features of these patients were : severe withdrawal, inertia, indifference to surroundings, flatness of af-

[1] Aristocort triamcinolone (9 α Fluoro 16 α hydroxy prednisolone) and placebo were supplied by Lederle Company for this study.

[2] Research Division, Nebraska Psychiatric Institute, and Dept. of Neurology & Psychiatry, University of Nebraska College of Medicine, Omaha, Neb.

fect, lack of outward anxiety, thought disorganization with delusions and hallucinations. None of the patients communicated spontaneously. All previous somatic treatments including chlorpromazine were ineffective in these patients.

The patients of the experimental group received chlorpromazine and Aristocort while those in the control group received chlorpromazine and Aristocort-placebo Doses were: chlorpromazine 200 mg.—400 mg./day, and Aristocort (or Aristocort-placebo) 8 mg.—16 mg./day. Medications were given 4 times a day for 3 weeks after which steroid was tapered off in one week. The Aristocort (or Aristocort-placebo) was given one hour before each chlorpromazine medication.

The "double blind" procedure was used and evaluation was based on the behavioral changes of the patients, observed daily by the ward attendants, research nurses and ward physicians. Each patient was also seen weekly by a physician in a more structured interview situation. Psychotherapy was not attempted.

RESULTS

Two patients of the experimental group, both women, showed a transient improvement consisting mainly of increased alertness to surroundings and better communicability. One of these spontaneously reported that she was "feeling better." The other showed a reduction in the degree of her delusional preoccupations and was able to communicate meaningfully.

One male patient of the control group showed a similar unsustained improvement in that he was able to participate in ward activities. Significant exacerbation of symtoms did not occur in any patient.

The medication of one male patient of the experimental group was discontinued on the 12th day of the study because of questionable findings on chest X-ray films and a persistent neutrophilic (segmented) granulocytosis of over 18,000 (a lesser degree of leucocytosis occurred in the remaining 4 patients of the experimental group).

Otherwise, no significant abnormalities of physiology were noted in the two groups.

In conclusion, adrenal steroid as given in this study seems at best only slightly beneficial in enhancing the responses of treatment-refractory chronic schizophrenics to chlorpromazine.

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EXPERIENCE WITH TRIFLUOPERAZINE IN THE TREATMENT OF 100 CHRONIC ANERGIC SCHIZOPHRENIC PATIENTS

LEON REZNIKOFF, M.D.[1]

One hundred chronic schizophrenic patients had been treated with trifluoperazine for a period of 3 to 12 months. The patients selected for this study were so-called chronic back ward patients predominantly so apathetic, resistive and withdrawn that it had been difficult to engage them in any ward activities.

A few of these patients would develop from time to time episodes of excitement during which they would become destructive and require either restraint or maintenance electric shock therapy.

These patients had been previously treated with shock therapy and numerous ataractic drugs, but either failed to maintain improvement, or relapsed soon after completion of therapy.

[1] Clinical Director, Hudson County Hospital for Mental Diseases, Secaucus, N. J.

The group consisted of 58 males and 42 females, varying in age from 21 to 69 years. The average duration of psychosis was over 9 years.

The following types of schizophrenia were represented in the group: paranoid type, 52; catatonic, 11; hebephrenic, 12; chronic undifferentiated type, 13; schizo-affective, 8; simple type, 3; mixed type, 1.

Trifluoperazine was used in doses of 4 mg. to 40 mg. per day, although majority obtained maximum improvement on about 20 mg. per day, and required about 10 mg. per day as a maintenance dosage after improvement had been achieved. A few patients refused oral medication and had to be given it intramuscularly; however, after one week there had been no difficulty in using oral medication. Trifluoperazine was given twice a day.

One female patient, A.H., developed marked athetoid movements after only 3 days on 5 mg. b.i.d.; the movement stopped when she was given caffeine sodium benzoate 7½ grains intravenously, Artane by mouth and trifluoperazine discontinued temporarily; after another week she was started again on smaller doses of trifluoperazine (2 mg. b.i.d.) which was later increased to 2 mg. t.i.d., but she had no further difficulties.

Forty patients (15 male and 25 female) developed extrapyramidal system symptoms, which subsided when the dose of trifluoperazine had been diminished and Artane, Cogentin or Akineton had been added to the therapy. The last three drugs were equally effective in controlling the extrapyramidal manifestations.

There were no cases of jaundice, skin rash or agranulocytosis; slight leucopenia was observed in a few patients; blood counts have been made on these patients at weekly intervals, on others once a month; there was no significant drop in blood pressure, nor marked gain in weight.

A female patient who had been treated previously with large doses of chlorpromazine and gained about 30 pounds in weight objected strenuously to it; after several months of trifluoperazine there was no change in weight.

Of the 100 patients, 21 improved sufficiently to be released for convalescent care; another 35 patients made a fairly good institutional adjustment to the extent that they began to participate actively in occupational and recreational departments; 44 patients made only slight improvement or no improvement at all, and therefore classified as unimproved.

Several patients did not begin to show any improvement until they had been treated with trifluoperazine for two or three months; then the improvement became so marked that all ward personnel and even other patients would comment on rapid rate of improvement, after initial advance had been made.

It is necessary to establish minimum maintenance dose for each individual patient. To maintain the improvement, trifluoperazine may need to be administered to these patients indefinitely. It is also interesting to note that some patients relapse when taken off medication for only a few days, or if the dose is drastically reduced.

Summary and Conclusions

1. One hundred chronic anergic schizophrenics refractory to all previous therapy had been treated with trifluoperazine over a period of 3 to 12 months.

2. Twenty-one patients improved sufficiently well to be released from the hospital for convalescent care, another 35 patients made a fairly good institutional adjustment to the extent that they are participating actively in occupational and recreational departments; 44 remained unimproved.

3. Forty patients developed extrapyramidal symptoms, easily controlled by Artane, Cogentin or Akineton.

4. The optimal dose had to be determined for each patient on an individual basis; some patients relapsed in a few days, if dosage was markedly reduced or discontinued, indicating that for these patients trifluoperazine therapy will have to be continued indefinitely.

5. No cases of jaundice, skin rash or agranulocytosis developed in any of these patients even after 12 months on the drug.

No marked changes in weight or blood pressure were observed.

Addendum: Since this paper was submitted, 6 more patients improved sufficiently to be released from hospital for convalescent care, making a total of 27.

TRIFLUOPERAZINE IN REFRACTORY SCHIZOPHRENIC PATIENTS

JOHN M. ERDOS, M.D., AND JULIUS HILLINGER, M.D.[1]

In November 1958, we began a clinical trial of trifluoperazine in a selected group of chronic schizophrenic patients from the Veterans Division of Kings Park State Hospital. Forty-seven patients who had failed to respond to several other kinds of therapy—including insulin, electroshock, chlorpromazine, proclorperazine, or lobotomy—were selected for this study. Their ages ranged from 25 to 70 years, with the majority in the 25 to 35 age group. They had been hospitalized from 1 to 12 years. Diagnostically they were categorized as follows:

Schizophrenia, paranoid	16
Hebephrenic type	16
Simple type	3
Catatonic type	4
Mixed type	1
Involutional melancholia	2
Psychosis due to alcohol, acute hallucinosis with paranoid features	1
Psychosis due to trauma	1
Psychosis with syphilis of CNS, menigo encephalitis	2
Psychosis with cerebral arteriosclerosis	1

METHOD

Before treatment patients were given physical examination, weight was recorded, blood pressure checked, and blood examined for any dyscrasia. These items were rechecked at the end of therapy.

Most patients were started on a 5 mg. tablet daily. Elderly or debilitated patients received one 2 mg. tablet b.i.d. Dosage was increased gradually during the first few weeks until most patients were receiving 5 mg. t.i.d., then increased to 10 mg. b.i.d. Nineteen of the 47 patients received 20 mg. as the maximum dose, while 12 others required 30 mg. a day. The remaining 16 received varying dosages from 10 mg. to 70 mg. daily. Only one patient required 70 mg. to control his hostile and aggressive behavior.

Three patients received trifluoperazine in combination with electroshock therapy.

[1] Kings Park State Hospital, Kings Park, N. Y.

RESULTS

(See following table). Improvement was classified as *marked* when there was a significant improvement in both mental status and ability; *moderate* when patients showed only slight mental improvement but good improvement in general behavior, verbal communication, and activity on the ward; *slight* when there was no effect on the patient's psychosis but a slight improvement in general behavior.

Marked improvement	7 pts.	(15%)
Moderate improvement	10 pts.	(21%)
Slight improvement	17 pts.	(36%)
No improvement	13 pts.	(28%)

All 3 patients who received trifluoperazine in combination with electroshock therapy showed marked or moderate improvement. Two of them had been receiving ECT without response until trifluoperazine was added. Patients continued on trifluoperazine on completion of ECT. No untoward effects resulted from combining ECT and trifluoperazine therapy.

SIDE EFFECTS

No hematological or hepatic complications or dermatological reactions or excessive gains in weight were seen. Side effects observed included the following:

Blurring of Vision: (One patient) probably due to the atropine-like effect of the drug. The effect subsided spontaneously without any change in the regimen.

Marked Extrapyramidal Symptoms: Severe tremors were seen in 2 patients. One of these was given Kemadrin (15 mg.) in conjunction with the 20 mg. of trifluoperazine he was receiving. The symptoms persisted and the trifluoperazine was discontinued and phenobarbital substituted. For 6 more days the patient showed marked restlessness, severe tremors and had crying spells. The reaction disappeared gradually and the drug was not reinstituted. Another patient also had marked tremors and some difficulty in swallowing; the reaction was controlled when the antiparkinsonian drug was added and the dosage of trifluoperazine reduced from 30 mg. to 20 mg. daily.

Dyskinetic Syndrome: (3 patients) One in particular presented severe symptoms: spasms of the neck muscles, extensor rigidity of the back muscles and corpopedal spasms. The reaction was quickly controlled in all 3 patients by the immediate administration of 7½ grs. of caffeine sodium benzoate intravenously. These patients were not continued on Stelazine.

Akathisia: (9 patients). This is a specific symptom consisting of restlessness and inability to sit down and relax. These patients were unable to sleep well at night and sometimes were found pacing the ward. These symptoms were observed especially at the beginning of the treatment and usually disappeared spontaneously within a few days or whenever the dosage of trifluoperazine was slightly reduced.

A number of other patients manifested slight tremors, which were brought under control very quickly with the administration of antiparkinsonian medication.

The use of trifluoperazine requires considerable care and individualization of dosage. When the drug is properly used, it appears to be helpful in patients who have not responded to other therapies.

Our thanks and acknowledgement are made to Dr. Charles Buckman, Director for his keen interest and helpful suggestions in preparing this report.

REPORT OF A CASE OF CONVULSION AND SKIN REACTION FOLLOWING BRIEF ORAL ADMINISTRATION OF IMIPRAMINE (TOFRĀNIL)

DANIEL GESENSWAY, M.D., AND KENNETH D. COHEN, M.D.[1]

Early clinical evidence suggests that Tofrānil in the treatment of depressions is well tolerated, with serious side effects rarely encountered. Literature supplied by the manufacturer(1) states that evidence of any effect on the convulsion threshold in epileptic patients is contradictory and inconclusive. One study(2) of 84 psychiatric patients receiving Tofrānil reported epileptiform seizures in 2 patients, one of whom had a past history of epilepsy and the other a characteristic EEG. A recent study by Pollack(3) reported no convulsive seizures in 273 patients. The case here reported exhibited a severe reaction to sunlight and grand mal seizures following brief administration of Tofrānil.

The patient, a 46-year-old white married housewife, was admitted to the hospital in September 1959 for the second time in 3 years. She is a very small woman who on admission appeared to be somewhat fearful and profoundly depressed. She would sit on the edge of her chair wide-eyed, staring vacantly into space. She became tearful when speaking of the recent death of a sister. She appeared to be preoccupied, withdrawn, with considerable psychomotor retardation. No gross disturbance of thought processes apparent. The patient stated that she began to feel increasingly depressed and tense since the death of her sister 4 months before admission to the hospital. She had difficulty with sleeping, some loss of weight, diminished appetite, but complained most of increasing trembling in her hands which she associated with nervousness.

Information from the patient's family stated that she has been ill for approximately 15 years with various somatic complaints including headaches, frequent cramps in her feet, spasms

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of the stomach associated with retching, shortness of breath, and occasional episodes of stiffness and tenseness over her whole body which would occur several times a year. These were believed to occur when the patient was excited over something, causing emotional strain. The patient had an electroencephalogram in January 1955, because of her headaches. This EEG was reported as showing fast frequencies with low voltage amplitudes, but was considered to be within normal limits.

Hospital Course : The patient was at once placed on 25 mg. Tofrānil q.i.d. and gr. 3 of Tuinal at bedtime. On the second day she experienced a grand mal type of seizure ; she was placed in bed and given phenobarbital. Tofrānil was discontinued. Physical examination revealed increased deep tendoned reflexes, but no other signs except what appeared to be a severe sunburn with erythema and edema over her face and the exposed portions of her hands and legs. Three hours later the patient had another grand mal seizure which lasted approximately 2 minutes. After Tofrānil was discontinued no further seizures occurred and the skin involvement gradually subsided within a few days. An EEG 3 weeks after her convulsions revealed profuse, sometimes sharp theta waves. This was reported as being consistent with, but not exclusively diagnostic of epileptic phenomena. An EEG was repeated 2 weeks later and the tracing was noted to be essentially unchanged except for slightly less theta activity.

It was felt that in this case sensitivity to Tofrānil may have been a precipitating factor in a moderately severe sunburn reaction and 2 grand mal seizures after very brief oral administration of the drug. These symptoms did not recur when the drug was stopped and no after effects were noted.

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THIORIDAZINE (MELLARIL)[1] IN THE TREATMENT OF CHRONIC SCHIZOPHRENICS

JOSEPH A. BARSA, M.D., AND JOHN C. SAUNDERS, M.D.[2]

In recent years an increasing number of phenothiazine derivatives has been developed for the treatment of mental illness. Clinical experience has shown that the more potent a drug is in its anti-psychotic effectiveness, *i.e.*, effectiveness in combating the delusions and hallucinations of the schizophrenic, the more prone is the drug to produce extra-pyramidal side effects. However, it has also been demonstrated that the development of extra-pyramidal symptoms is not essential to the anti-psychotic action, for in many instances the use of anti-parkinson drugs can entirely remove the extra-pyramidal side effects and not diminish the anti-psychotic efficacy of the tranquilizer. Efforts have been made, therefore, to develop a phenothiazine derivative with anti-psychotic action but without extra-pyramidal side effects. Thioridazine (Mellaril) has been described as such a drug[3]. The purpose of the present study was to test thioridazine in the treatment of chronic schizophrenics who had developed extra-pyramidal symptoms with other phenothiazine derivatives.

One hundred chronic female schizophrenics between the ages of 16 and 71 were selected. They had been continuously hospitalized for 2 to 25 years. They had been receiving a variety of tranquilizing drugs for 2 to 4 years, and during the last 6 months had reached a plateau of slight or moderate improvement in their psychosis. Forty-two patients were receiving chlorpromazine (Thorazine), 5 proclorperazine (Compazine), 3 trifluoperazine (Stelazine), 12 chlorpromazine combined with proclorperazine, 37 chlorpromazine combined with trifluoperazine, and 1 chlorpromazine with reserpine. Furthermore, with all of these patients it had been necessary to add benztropine methanesulfonate (Cogentin) to the medication in order to relieve extra-pyramidal side effects such as,

[1] Mellaril was supplied by the Sandoz Pharmaceutical Laboratories, Hanover, N. J.

[2] Rockland State Hospital, Orangeburg, N. Y.

Parkinsonism, akathisia and dystonic symptoms. The above tranquilizing drugs and the benztropine methanesulfonate were discontinued immediately prior to this study with thioridazine.

The dose of thioridazine was started at 50 mg. q.i.d. and was gradually increased until either satisfactory therapeutic results were achieved or significant side effects appeared. In the first month, when the dose of thioridazine was not above 400 mg. a day, no extra-pyramidal symptoms were observed. However, 7 patients complained of dryness of the mouth, 6 of dizziness, and 3 of a "hangover" feeling. As the dose of thioridazine was raised (600-2000 mg. a day), some patients showed evidence of extra-pyramidal symptoms, necessitating the addition of benztropine methanesulfonate. Eight patients developed signs of Parkinsonism, 5 generalized tremulousness, 10 akathisia, and 2 dystonic symptoms. There were also two patients with photosensitivity. Two patients on 100 mg. q.i.d. and 200 mg. q.i.d. respectively had grand mal convulsive seizures for the first time, even though they had been on equally high doses of chlorpromazine in the past without incidence of seizures.

Thioridazine was administered for 5 months, and at the end of this period the patients' progress as compared to their mental condition just prior to this study, was evaluated as follows: 3 patients were markedly improved, *i.e.*, in remission and ready for release, 16 moderately improved, 44 slightly improved, 33 unimproved, and 4 patients were worse, being more tense, overactive, irritable and disturbed.

It was observed that thioridazine, as compared to chlorpromazine, had a weaker sedative effect even when high doses were used. Thus, it was not as useful as chlorpromazine in treating the very disturbed patient. On a milligram for milligram basis, the anti-psychotic effect of thioridazine was not as potent as that of chlorpromazine, and higher doses of thioridazine were needed to achieve the same effect. However, one of the advantages of thioridazine was that even with high doses excessive drowsiness and lethargy were usually not produced. In chronic schizophrenia, therefore, thioridazine's greatest usefulness appears to be in the treatment of those patients who develop severe or persistent extra-pyramidal symptoms with one of the other phenothiazine derivatives.

[3] Kinross-Wright, V. J.: J.A.M.A., **170**: 1283, 1959.

MELLARIL IN THE TREATMENT OF CHRONICALLY DISTURBED PATIENTS: WITH SPECIAL REFERENCE TO REDUCED EXTRAPYRAMIDAL COMPLICATIONS

A. KHAKEE, M.D., AND G. F. HESS, M.D.[1]

One of the limiting factors in the use of of the phenothiazine derivatives is their tendency to induce extrapyramidal stimulation, ranging from akathisia to Parkinsonism, at doses which do not provide adequate tranquilization. Concomitant use of anti-Parkinson drugs, adds additional cost to therapy without eliminating the basic cause of extrapyramidal stimulation.

Reports that a comparatively new phenothiazine, Mellaril[2] (thioridazine hydrochloride), was relatively devoid of extrapyramidal stimulation while yet effective as a neuroleptic prompted us to undertake the evaluation reported here. A total of 22 patients were selected from the male psychiatric service; 18 of these had responded with extrapyramidal symptoms to every phenothiazine previously employed. The remaining 4 had remained completely refractory to all forms of therapy.

All 22 were chronic cases, 6 having been hospitalized for from 1-5 years, and the remaining 16 for periods in excess of 5 years. Diagnoses were: 18 schizophrenic reactions and one each of generalized

[1] Danvers State Hospital, P. O. Hathorne, Mass.
[2] Sandoz Pharmaceuticals, Hanover, N. J.

paresis, epidemic encephalitis with psychosis, manic-depressive, and alcoholic deterioration. The usual starting dose was 300 mg. daily, except for two debilitated patients who received 100 mg. daily. Range of dosage initially was from a minimum of 100 mg. to a maximum of 600 mg. daily, which was then reduced as indicated to a maintenance dose of 300-400 mg. per day.

At the time the 18 patients were switched to Mellaril, each one was exhibiting extrapyramidal symptoms to one of the following drugs; chlorpromazine, trifluprομazine, mepazine or trifluoperazine. Within 72 hours after the institution of Mellaril, there was complete remission of these symptoms in 15 patients. Drooling, tremulousness, motor restlessness and mask-like facies disappeared, food intake increased and the patients became generally more manageable. No reappearance or evidence of extrapyramidal stimulation whatsoever has been observed in these 15 patients during their treatment with Mellaril. The remaining 3 patients required a reduction in dosage and adjunct medication to relieve their extrapyramidal symptoms.

The clinical improvement in mental status was as follows: one patient markedly improved and paroled; 5 patients greatly improved and transferred to front wards; 9 patients moderately improved but retained in the same ward; 3 patients not improved.

The remaining 4 cases, diagnosed as schizophrenic reaction, had been refractory to previous therapy. Two of these improved sufficiently to permit home visits for one and placement of the other in a parole ward.

Two patients who had exhibited photosensitivity to other phenothiazines did so to Mellaril as well, but improved on routine therapy and a reduction in dosage. Hypotension occurring in 3 patients was controlled by a reduction in dosage. One patient showed "catatonic" symptoms on 400 mg. which cleared up when the dose was reduced to 200 mg. daily. Examination has failed to reveal any evidence of jaundice or blood dyscrasias during the entire 9 months' course of treatment with Mellaril.

SUMMARY

Moderate to marked improvement in psychomotor behavior was obtained with Mellaril in 17 of the 22 cases in this series. In addition, there was complete elimination of extrapyramidal activity in 15 of 18 patients who had manifested Parkinsonian symptoms with the drugs previously employed. Our observations indicate that Mellaril is equally effective, or more so, than other phenothiazines in the treatment of various psychiatric disorders, but has a distinctly lessened tendency to induce extrapyramidal stimulation. In our experience, this is a significant contribution to the more effective management of larger numbers of disturbed patients.

SLEEP REGULATION WITH THALIDOMIDE

SIDNEY COHEN, M.D.[1]

Insomnia apparently is a widespread disorder; measures other than drugs can usually induce satisfactory relaxation and sleep in the milder cases. However, when tension, anxiety or depression impairs sleep the long hours of restless wakefulness augments the underlying disorder and chemical intervention may be indicated. Occasionally, lesser tension states and situational depressions will respond satisfactorily merely with correction of the insomnia.

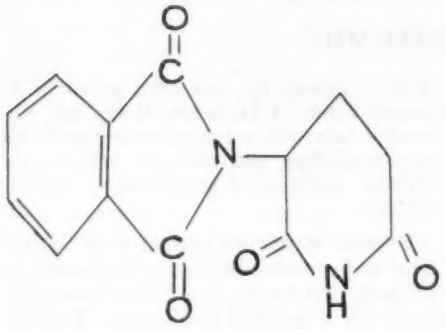
Accidental or suicidal overdosage and habituation to the hypnotics are serious drawbacks to their use. Many non-barbiturate sleeping medications have been proposed but the ideal, non-toxic, non-habit forming agent is yet to be found.

Thalidomide[2] is a further attempt to

[1] From the Neuropsychiatric Hospital, VA Center, Los Angeles 25, Calif.

[2] Kevadon is the trademark of the Wm. S. Merrell Co., Cincinnati, Ohio for its brand of Thalidomide.

provide a safe somnifacient. Opinions about its capacity to addict will have to await future studies, no instances of habituation have been reported to date. Thalidomide is alpha (N-phthalimido)-glutarimide represented structurally as :



The LD_{50} of thalidomide in mice could not be determined by Kunz, *et al.*(1). Oral and subcutaneous doses of 5 gm/kg and 1 gm/kg intraperioneally were well tolerated and did not produce death in any of their animals. Thalidomide has been used extensively in Europe(2). Reports of death due to overdosage have not appeared. A 70-year-old patient survived a single dose of 2100 mg. without treatment(3).

Thalidomide was given to 50 neuropsychiatric inpatients for whom barbiturates, chloral hydrate or glutethimide had been routinely ordered. Single bedtime doses of 100 to 200 mg. were administered with an occasional patient requiring only 50 mg. The patient's subjective impression of the sleep producing and sleep sustaining properties of thalidomide as well as a comparison with his prior sleep medication were recorded. The nurses charted their overall impressions of the patient's nocturnal activities.

The results over a 6-month period have been very satisfactory. Some patients report that thalidomide is the best sleep inducing medication that they have ever taken. A few state that it is ineffective even in 200 mg. amounts. Excellent results were obtained in 21 patients (42%). They had the subjective recall of restful sleep without associated grogginess or dizziness on awakening. Seventeen (34%) considered that it produced good hypnosis but there were occasional nights when sleep was broken or not restful. Five patients (10%) stated that thalidomide produced adequate nocturnal sedation, but they complained of a "hangover" upon awakening. Although tolerance to this side effect developed after additional doses, this group were considered treatment failures. Seven patients (14%) persistently complained either of poor induction, broken sleep or very early awakening.

In order to explore the possibility that thalidomide might have ataractic properties, 15 additional seriously disturbed psychotic patients were given total daytime dosages of 1200-2500 mg. The drug was less effective than the available phenothiazines for this purpose. It was interesting to note, however, that these large amounts did not produce stupor. Respiratory depression did not occur. Serial hemograms, liver panels, urine analyses and blood creatinines were unchanged from control values. Abrupt discontinuance of thalidomide did not result in a withdrawal syndrome. One of the patients developed an erythematous rash and temperature of 100.6° rectally. Another patient on the high dosage study had a blotchy rash and convulsed while on thalidomide. The medication was discontinued in both cases without further sequellae.

SUMMARY

Thalidomide is an effective agent for the treatment of insomnia with a safety factor which makes its use desirable when there is danger that accidental or deliberate overdosage may occur.

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CASE REPORTS

AN UNUSUAL PERVERSION: THE DESIRE TO BE INJURED BY AN AUTOMOBILE OPERATED BY A WOMAN

MARTIN H. KEELER, M.D.[1]

Some perversions, while representing formidable psychopathology, are also tributes to the complexity of the human mind and unconscious ego mechanisms.

The patient, a man in his late twenties, reported a periodic desire to be injured by a woman operating an automobile. This wish, present since adolescence, he had by dint of great ingenuity and effort, gratified hundreds of times without serious injury or detection. Satisfaction could be obtained by inhaling exhaust fumes, having a limb run over on a yielding surface to avoid appreciable damage or by being pressed against a wall by the vehicle. Gratification was enhanced if the woman were attractive by conventional standards. Injuries inflicted by men operating automobiles or other types of injury inflicted by women had no meaning. He experienced pleasure from the experience, thus establishing the symptom as a perversion rather than a compulsion.

The patient's sexual, social, and occupational adjustment was good and his intelligence superior. He intellectualized to a considerable extent but could experience and manage strong positive and negative feelings. He was ashamed of his symptom but somewhat proud of its unusual nature. A Minnesota Multiphasic Personality Index did not demonstrate significant psychopathology and did not indicate the probable presence of perversion or impulse neurosis.

Because of limited contact with the patient and considerable use of repression on his part, past history is not considered adequate for a detailed formulation. Two unusual biographical items were the presence of considerable maternal rejection and of a clouded and probably distorted memory of being hurt at the age of 6 by some woman in a manner connected with sexuality. This case does not seem to be unusual in terms of the genetic and dynamic factors involved but is of interest as it demonstrates the complexity of ego operation that can be involved in a perversion. At least two interlocking themes are necessary for an essentially masochistic gratification. The injury must be inflicted by a woman, probably as a defense against other feelings involving women, and must be inflicted by an automobile, this probably having specific symbolic meaning.

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TRANSIENT VISUAL SYMPTOMS ASSOCIATED WITH MELLARIL MEDICATION

S. BERGEN MORRISON, M.D.[1]

In the fall of 1955 the author was a senior resident in an outpatient clinic during the time Kinross-Wright was carrying on a study involving the use of a phenothiazine called NP-207 (piperidinochlorphenothiazine). NP-207 was an experimental phenothiazine that never reached the open market as visual changes were noted in the patients in the form of a retinitis pigmentosa. Patients that we saw complained of an inability to see clearly when they had come indoors after having been in the bright sunlight. Many of them showed eyeground changes and a marked loss of vision although early no retinal changes could be detected.

Since these 28 cases were seen in 1955,

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I have been alert as to the possibility of symptoms of this sort occurring with other phenothiazines, although no attempt has been made to question patients directly about whether or not they had symptoms of blurring of vision or dimness of vision on coming in from out of doors. Recently a case has been seen showing the same type of toxic reaction to Mellaril (thioridazine). Mellaril is identical to NP-207 except that a thiomethyl group has been substituted for the chloride.

The patient was a 17-year-old white school boy who was first seen in September of 1959. He was considered to be a schizoid adolescent who was on the verge of a major schizophrenic episode. When first seen, he was put on Pacatal (mepazine) 75 mgm. daily and remained on this medicine for 18 days. The patient then complained that he was not being relaxed enough and was changed to Mellaril 75 mgm. daily. The patient felt relaxed for a time on Mellaril, and remained on 75 mgm. daily until one month later when he was admitted to the hospital in a major schizophrenic episode.

While in the hospital, the patient received Mellaril up to 1200 mgm. daily and remained on that dosage for 12 days. He also received 8 electric shock treatments along with sodium amytal as needed for sleep. He remained in the hospital for 22 days and was dismissed as improved. Three weeks later at the time of a follow-up visit the patient complained that he was not able to see as he came into my office and that he could not read print while sitting at my desk. He had noticed that he was having difficulty seeing when he came in from the outside and had noticed this for approximately 7 to 10 days. No previous visual problems had occurred. At this time he was receiving 400 mgm. of Mellaril daily and had received this amount for the previous 30 days. The patient's eyegrounds were checked in the office and were found to be negative. All medication was stopped. Complete eye examination was done by an ophthalmologist and was considered to be negative. The patient was seen again in 2 weeks and said that he could see much better on coming indoors than he had on the previous visit although he did not feel that his vision was completely normal. He was seen 2 weeks later and indicated that he was able to see clearly in my office and was able to read print normally. In all, the patient had received approximately 30 grams of Mellaril. It cannot be forgotten that he was on Pacatal briefly for a period of 18 days ; however, he had not been receiving Pacatal for almost 3 months prior to the onset of his symptoms. It is understood that at least 3 reactions of this sort have been noted with Mellaril to date.[2] It is felt that an alertness to complaints of this type is needed if serious visual changes are to be avoided in certain patients receiving Mellaril. It is possible that other compounds whose structure is similar could also cause a toxic retinitis.

Summary

A case is presented in which a patient complained bitterly of blurring of vision when coming in from out of doors while receiving Mellaril and after having received approximately 30 grams of Mellaril over a period of 2½ months. The visual complaint cleared over a period of approximately 4 weeks after the Mellaril had been stopped. It is suggested that this is an early toxic reaction to Mellaril of the type seen previously with an experimental phenothiazine called NP-207.

[2] Personal communication.

HISTORICAL NOTES

DR. RUFUS WYMAN OF THE McLEAN ASYLUM

ERIC T. CARLSON, M.D., AND MAY F. CHALE, A.B.[1, 2]

Although Dr. Rufus Wyman appears to have been the first fulltime medical superintendent of an Americal mental hospital, his rôle in the history of American psychiatry has not received sufficient attention and emphasis. Born on July 16, 1778, in Woburn, Massachusetts, a member of the fourth American generation of a family that had emigrated to Massachusetts in 1640(1), he was graduated from Harvard College in 1799. After teaching school for one year he embarked upon his medical apprenticeship, and subsequently established an office in Chelmsford.

In his 10 years of general practice Wyman's reputation as a successful country doctor rose rapidly and the demand for his services put him under considerable physical pressure. Ill-health from probable tuberculosis may have contributed to his seeking the newly-established and presumably less arduous post of physician-superintendent at the McLean Asylum. Up to this point there is no evidence that he had any special training in or inclination towards psychiatry.

In January 1817 the Hon. Benjamin Pickman recommended Wyman for the superintendency of the asylum. In the spring of 1818 Wyman's only competitor, Dr. George Parkman, for unknown reasons withdrew his application and Wyman was appointed. In May, Wyman made a tour of the hospitals in New York and Philadelphia, and on October 6, 1818, the first patient was admitted to the McLean Asylum. This asylum was the first mental hospital in New England, and as such represented an experiment: it was founded not only to provide medical treatment for the insane, but also to introduce to New England what Wyman called "a revolution in treatment"—moral treatment.

Wyman's therapeutic theories had two main sources: Pinel and the Tukes, with the latter influence definitely predominant (2). Wyman quotes from Pinel's writings and may also have derived more intimate knowledge of the Frenchman's work from a friend, Dr. William Walker, who had spent some time in Paris, and from Dr. Parkman, who had studied under Pinel. The influence of the English Quakers and their York Retreat is more obvious and direct. The Friends' Asylum in Philadelphia, which Wyman had visited, was patterned after the Retreat, and Thomas Eddy, whom he had met, had adhered closely to the pronouncements of the Tukes in his campaign to found the Bloomingdale Asylum in New York. Wyman himself had read Tuke's works and recommended them to others.

In his neurophysiology Wyman accepts the conception of the brain as the organ responsible, both through perception and volition, for contact with the outside world. He avoids the arguments of both materialism and immaterialism and, as a good associationist, doubts that the brain itself can initiate any knowledge or action. In stressing that one should observe and emphasize the actions of man rather than the terms by which they may be called he reveals himself as a phenomenologist. He divides phenomena into three orders: the first, physical or inorganic; the second, organic, including both vegetables and animals; and the third, mental, which is restricted solely to the animal world. Since in his opinion the body and the mind are mutually dependent, he strongly advocates that physicians have as thorough knowledge of the mind as of the structure and function of the body. He believes that the body and mind can produce diseases in each other.

In his psychology he emphasizes the need for close observation, following the method

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[2] This investigation was supported in part by a Research Grant (M-2146) from the National Institute of Mental Health, U. S. Public Health Service.

of Bacon. He is primarily a Lockean associationist, and although he mentions the Scottish faculty psychologists (Reid, Stewart, and Brown), he denies that faculties can be integral parts of the mind. He states, "There is but one agent acting in different ways, or performing different acts." In this stand he also shows no evidence of being influenced by the phrenological theories that were then coming to this country. He complains that even the approved medical writers often show great ignorance of mental functioning, which he feels should be separated into two main divisions: knowledge, or intellect, and the passions, or affections and emotions.

He states that a definition of insanity is difficult, and perhaps even impossible, to formulate, but no more so than a definition of physical illness. He starts off with an idealistic definition that any variation from a perfect state of health must be considered a disease. He modifies this with respect to physical diseases by stating that they should be associated with discomfort or pain, and then attempts a similar modification for mental disease, using a social concept of how other, normal people will judge the individual insane by his behavior. Strange opinions are acceptable in science, but not in ordinary matters. If the strange opinion or behavior is due to lack of information or experience, then the person, if healthy, should respond to education or evidence. Wyman goes on to state that, to the legal world, a delusion or false belief is essential to insanity, but insists that doctors must go further than lawyers to understand how this state arises.

Wyman divides his concept of psychopathology, in which he does not discuss diagnosis, into the two major categories of the mind: the intellect and the passions. The intellect can suffer from perversion, diminution, or augmentation. With the first, perversion, patients usually start from incorrect premises, but reason correctly. He does recognize, however, that faulty reasoning from sound premises occasionally occurs. With diminution, slowness of thinking or poor memory may be present. In the case of augmentation some may deny that it is a disease, being instead a benefit, but he points out that this condition is usually temporary, with one or more functions out of proportion to the rest of the mental structure.

In the case of the passions, only exaltation or depression can occur. Wyman agrees with Pinel, moreover, in asserting that diseases of the passions or intellect can exist separately, and he states, "These diseases are more to be dreaded than any other, to which man is liable." He recognizes the passions as the main driving source of man's actions, and realizes that when they become excessive the intellect is unable to control them. He feels that in a sound state of mental health the passions are under control, and that an individual must constantly exercise the control function in order to remain healthy. Besides exaltation and depression he recognizes an alternation of both, and gives an excellent clinical description of the transition from a depressed to a manic state. He concludes that a pure disease in one of the functions of the intellect or passions is rare and that there is usually a mixture of almost infinite variations. He makes no sharp distinction between the normal and the insane mind; he points out that the boundary is at best a thin one, and that usually a gradual attack of insanity occurs with almost imperceptible changes at first.

Wyman's theories about psychiatric therapy were derived from his own psychological conceptions and the teachings of earlier advocates of moral treatment. Among his fundamental therapeutic principles are the following: the patient must always be removed from his home and must always receive moral treatment, even if his insanity arises from organic disease; his treatment must extend over an adequate period of time and, above all, he must consistently receive only mild and kindly care. Wyman admits that medical treatment may be required if there is organic disease, but in general he is opposed to bleeding, purging, and low diet, feeling that these methods are seldom beneficial, usually injurious, and frequently fatal. At best the medical treatment must be suited to the state of the individual patient.

To the contrary, moral treatment is for all patients, no matter what their psychiatric state or its cause. In moral treatment it is

important to divert the mind from unpleasant subjects and to break up old associations of ideas. This goal can be achieved through exercise of the body and mind and through formation of correct habits. A constant pattern of life in the hospital through encouragement of proper conduct and adherence to rules and regulations regarding the time of arising and retiring, eating, and exercising are essential to tranquilizing the mind. Patients are encouraged to avoid violence and are told that, if necessary, restraints will be used. Because of the importance of constancy, kindness, and vigilance, Wyman stressed the necessity of obtaining sound, mature, and amiable attendants. He recruited many of his early attendants from the ranks of schoolteachers.

The activity program of moral therapy at the McLean Asylum included both work and recreation. In the former category were such occupations as sawing wood, gardening, sewing, embroidering, and studying the various mechanic arts. For amusements there were draughts, chess, backgammon, ninepins, and music, as well as reading, writing, walking, riding, and swinging. Wyman states in addition that conversation between patients is often useful in showing them the absurdity of their thoughts.

In order to care for the patients effectively, Wyman classified them by sex and by degree and nature of illness. Men and women were kept separate and cared for only by members of the same sex. These two groups were then subdivided into three classes according to their psychopathology, with each class under a supervisor. Each class made up a distinct family, with its own bedrooms, dayrooms, dining rooms, bathing rooms, and airing yards. Each patient had his own bedroom, moreover, so that there was less need for restraint. Chains and straitjackets were never used, and other restraint only with the permission of the supervisor, who then reported it to the superintendent. The punitive aspect of restraints was thereby avoided. No employee was allowed to strike a patient, even in self-defense. Wyman undoubtedly had difficulty applying this classification in the early years when the number of patients was minimal, but this grouping was probably quite effective with 65 to 70 patients maximum in the hospital, all of whom the physician visited at least once a day.

In the first 5 years of the hospital 28% of the patients were discharged as recovered, while in the second 5 years 43% recovered, and in the third, 40%. Wyman ascribed this appreciable increase to a regulation put into effect in the fall of 1823 that all patients removed before 3 months (as unrecovered) would have to pay for the entire 3 months. This provision contributed to an adequate length of therapy. Over the 15 years of his superintendency Wyman discharged 68% of his patients as improved or recovered, while 9.5% died while in the hospital.

Throughout his medical career Wyman was active in the Massachusetts Medical Society; for many years he served as censor and counsellor from his district and during the last two years of his life he served a term as President. In 1830 he was selected to deliver the annual address to the society. His discourse, "Mental Philosophy as Connected with Mental Disease," was later published in pamphlet form. This, an earlier pamphlet on religion(3), and his annual reports, are his only published writings. The contents of this pamphlet have been discussed in the earlier section on his psychiatric thought.

Also in 1830 Wyman corresponded with Gov. Lincoln of Massachusetts regarding plans for the new State Hospital at Worcester. He wrote of his ideas and offered to lend his assistance provided that he would not be called away from his duties at McLean.

Two years later, however, he decided to resign these duties because of ill-health. But the McLean trustees refused his resignation, allowing him only a leave of absence to improve his physical condition. This time he spent on a trip to northern New England with his wife and daughter. He was then a member of the committee of the Massachusetts Medical Society investigating the question of whether the Asiatic cholera was contagious, and since cholera had just entered Canada, and in spite of his impaired health, he left his family and proceeded to Montreal in order to study the question further. He observed

the patients directly until he himself became ill with a gastro-intestinal disorder (not cholera apparently). He then returned to McLean, only to attempt unsuccessfully to resign in August. In September, however, the trustees voted to separate the duties of physician and superintendent and asked Wyman to remain on as physician at an unchanged salary. Wyman found even this less time-consuming post burdensome to his health, however, and on January 9, 1835, his resignation was finally accepted. He was elected a trustee but declined this position also because of his health.

Upon his retirement he moved to Roxbury, where he engaged in philosophic pursuits and the cultivation of his home and grounds. Married since 1810, he was the father of 6 children and was greatly devoted to his wife and family. He maintained his outside interests also, continuing active in the Massachusetts Medical Society and the American Academy of Arts and Sciences. He later became President of the Norfolk Temperance Society. Although semi-retired he was much in demand as a psychiatrist and he generally had a few psychiatric patients living with him and his family up to the time of his death of a lung infection on June 22, 1842.

Because he was a modest man who made no effort to advance his own fame it is difficult to learn much about his personality. He was hard-working and devoted to his post, being absent from the asylum only 5 nights in his first 14 years there. He seems to have been respected and to have become the friend and confidant of his patients. He had a reputation for justice, honesty, and integrity, as well as for a talent for practical mechanics. Two of his sons, Morrill and Jeffries, became physicians after being graduated from Harvard and went on to attain greater public fame than their father, but his many years of conscientious service and his enlightened use of psychological treatment for the mentally ill made it appropriate that in later years such diverse people as Luther Bell, Amariah Brigham, and Oliver Wendell Holmes should honor him for his contributions to the development of American psychiatry.

Acknowledgement: Appreciation is expressed to Evelyn A. Woods, A.B., for her assistance in the preparation of this paper.

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JOHANN CHRISTIAN REIL
1759-1813

ERNEST HARMS [1]

Outside his native Germany, hardly more than the name of Johann Christian Reil is known. There was considerable astonishment when, in 1957, I published, in the British Journal of Mental Science (Vol. 103, No. 433), a paper entitled *Modern Psychotherapy 150 Years Ago*, in which it was shown that no psychiatrist before 1900 had presented more of the basic ideas of this century's psychotherapy than had the author of *Rapsodien ueber die Anwendung der psychischen Kurmethoden auf Geistes-*

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zerruettungen (Rhapsodies on the Application of Psychotherapy to Mental Diseases), published in 1803. I venture to predict that later centuries will hand the palm to J. C. Reil as the greatest of them all.

This prediction is not based entirely on the *Rhapsodies*, which led Kirchhoff to call Reil the "conscious discoverer and founder of rational psychotherapy," but also on a number of shorter and now completely unknown works of Reil which were published during the last 5 years of his life. Together with his colleague, Hoffbauer, Reil published, in 1808 and 1812, two volumes of *Beträge zur Befoerderung einer Kurmethode auf psychischen Wege* (Contributions to the Advancement of Psychotherapy), which had originally been intended as a journal. In it we find 9 major contributions by Reil, the longest of which *"Ueber die Centricitaet der Organismen"* (On the Centricity of the Organisms) (1812), presents the most magnificent psychological-biological philosophy I have ever encountered and which would require a long paper to adequately describe. In this memorial note I should like to point to another of the Reil papers, *"Das Zerfallen der Einheit des Koerpers im Selbstbewusstsein"* (The Disintegration of the Unity Experience of the Body in the Self-Consciousness) (1808). In this paper Reil presented a somatological concept of what we today designate as *schizophrenia* and which appears clearer and more convincing than anything presented since. Reil is a psychological phenomenologist for whom the modern concepts of *Ganzheit*, totality, unity, centricity basic elements of scientific interpretation. Psychologically, human experience is a unit experience of body and mind which are to one another, also inseparably tied together in the self-consciousness. If, by the process of abstraction, one boils down all bodily and psychic experiences, one arrives at a final self-recognition which Reil calls the *"Gemein-Gefuehl"*—the basic "completely empty" feeling of being and existence, in which the body is felt vaguely, but the experience is nevertheless that of a unit. There is no notion of space or weight, but only of time. For those born blind and deaf, the *Gemein-Gefuehl* is the major "sense"; for all human individuals it is the most elementary experience.

It is the *Gemein-Gefuehl* as psychic function that holds our mental life together and mediates between the multitude of elements of which it is composed. It is the carrier of our ego, as well as the frame of our self-consciousness. It is therefore practically involved in all of our perceptions and activities.

A disintegration of the *Gemein-Gefuehl* is the cause of a large number of mental ailments. Its impairment means that it loses the ability of functioning in binding together and controlling the various psychic dynamics. Reil distinguishes two forms of such disfunctioning of the *Gemein-Gefuehl*. The first, the minor form, is a *Lockerung* (loosening) of control; the major form is complete destruction of the *Gemein-Gefuehl* which renders it unfit to coordinate the various mental functions. In the examples offered by Reil we see the most evident cases of what Kraepelin and Bleuler called dementia praecox, what Morton Prince called the split personality, and what we today commonly call *schizophrenia*. There is the case of the patient who believes he is not himself, that he is someone else or has someone else's body. There is the patient who is not sure whether the hand he writes with is his hand or whether it is his right or left hand. There is the patient who believes himself incapable of using this or that part of his body, or has a catatonic freezing of the posture or of the tongue. There is the case of the person who does not know that it is he who is speaking and who uses false words. Another well-known pattern is that of the patient who is unable to distinguish between the actor and the listener. There are the cases of dissociation of space, in which nearby sounds and objects appear to be distant and distant ones oppressively near. And there are the most serious paranoid forms of split and double personality in which the ability to recognise reality does not exist.

Reil was far from being a "psychist" who believed that all mental illnesses are entirely psychic. He recognized the actual neurological diseases and the validity of somato-psychological aspects. But based on

his concept of the *Gemein-Gefuehl*, he maintained that they were "diseases of the psyche," that is, of the basic unity of our mental or psychic disposition. At one point he designated the phenomena as illnesses of the centricity power of the organization of the psyche, which has primarily a dynamic function.

Towards the end of his treatise, Reil tries to make it very clear that in the cases described there exists, of course a relationship between the psyche and the nervous system as well as the rest of the physical organism, which may or may not have become involved or affected. Basically, however, the disintegration that Reil described, and which description represents the first full-fledged presentation of schizophrenia, is a psychic pathology. Although the theory that schizophrenia is entirely or primarily a psychic disease has been seriously challenged in recent years, it has yet to be determined whether the psychiatrist who was the first to describe it as such was right or wrong. Nevertheless, the amazingly clear presentation by Reil in 1808 deserves to be known, and it should survive the struggle of opinions about it.

COMMENTS

REGIONAL PSYCHIATRY

For a considerable time we have published each year in one of the Spring issues of this *Journal* a survey of psychiatry facilities in the city where the annual meeting of The American Psychiatric Association is to be held, and in the surrounding area as well ; sometimes including an outline of the history and organization of the psychiatric services of the state concerned. This has been possible through the courtesy of members active in the respective regions.

The purpose of these articles on regional psychiatry has been to familiarize attending members with the work going on in the area where they meet and to facilitate visits or further inquiries they may wish to make.

Five years ago the annual meeting was held in Atlantic City, New Jersey. This year's meeting is the sixth to convene in this popular seaside resort. An excellent comprehensive account of psychiatric institutions and activities in the State of New Jersey was prepared by Dr. Henry A. Davidson, Superintendent and Medical Director of Essex County Overbrook Hospital at Cedar Grove, and appeared in the April 1955 issue of the *Journal*. Visiting delegates are referred to this article.

The following changes and additions have been made :

New Jersey's mental health program is operated by the Division of Mental Health and Hospitals in the Department of Institutions and Agencies. Mr. John W. Tramburg is the Commissioner, and the Director of Mental Health and Hospitals is Dr. V. Terrell Davis, a fellow of the American Psychiatric Association. Significant developments since 1955 include :

1. Reduction of the census in the state hospitals to current figures :

Greystone Park	5200
Trenton	3300
Marlboro	3000
Ancora	2250

2. The establishment of an active Bureau of Research in Psychiatry and Neurology under the direction of Dr. Joseph Tobin. The laboratories and offices of the Bureau are located on the grounds of the New Jersey Neuro-Psychiatric Institute at Princeton.
3. The establishment of a state supported community mental health services program which has replaced the former mental hygiene clinics of the state hospitals and has been accompanied by the development of outpatient departments providing a continuum of services to patients applying to the State mental hospitals.
4. Seton Hall College of Medicine, New Jersey's first and only medical school, will graduate its first class of students in June of 1960.

AMERICAN CHILD PSYCHIATRY, LTD. ?

A few years ago, I received a complimentary copy of a Russian textbook of child psychiatry by a leading representative of the specialty. Not one of the innumerable references gave the slightest indication that any work had ever been done outside the geographic boundaries of the Soviet Union. There was one casual mention of Kraepelin and one of Mayer-Gross. *Viola tout.*

How do we in this country fare by comparison ? A comprehensive 1958 survey of the problems in mental abnormality offered a bibliography of 303 items ; of those only 13 (4.3%) referred to articles in languages other than English. The papers published in 1958 in an American quarterly, the bulk of which is devoted to child psychiatry, referred to a total of 476 sources, of which 15 (3.2%) stemmed from non-English authors. There were, in addition, 22 quotes

from translations of German-language contributions, of which 17 were early psychoanalytic treatises (12 by Freud, 3 by Fenichel, and 2 by Ferenczi); 26 book reviews dealt exclusively with books in the English language. At the 1954 *International* Institute of Child Psychiatry, 18 of 24 papers were read by persons residing on the North American Continent (17 from U. S. A., one from Canada); the references appended to those studies did not contain a single item reported in a foreign language.

This is slightly better than the total omission of non-domestic investigators in the Russian textbook but hardly a cause for self-congratulation. The impression is given that we here do not know about, or do not care for, work done elsewhere. In fact, one is left with the feeling that no such work is being done or has been done elsewhere or that, if it does exist, it does not merit our serious attention. It is a rare American child psychiatrist, indeed, who has ever heard, for instance of Ziehen, de Sanctis, Homburger, Tramer (the man who has coined the very term, child psychiatry), Heuyer, van Krevelen, Stutte, Lutz, or Michaux, all of whom have helped or are helping substantially to build the specialty. Equally rare is the American child psychiatrist who finds occasion to consult the *zeitschrift für Kinderpsychiatrie*, the *Études de neuro-psycho-pathologie infantile*, *Infanzia anormale*, and other periodicals, or the excellent monographs issuing from the Scandinavian countries—valuable depositories of significant investigations.

Anyone familiar with those publications or visiting the centers from which their contents originate knows that this seeming snub is not reciprocated by the men abroad. Our books and journals are read and quoted, and the European child psychiatrists are well acquainted with the work of their confrères across the ocean, at the same time a bit puzzled by our apparent lack of interest in their own contributions.

Of course, there is no deliberate snub on our side, nor is the described situation created by nationalism. There certainly is no intention of self-containment and, it is hoped, no smug conviction that we are in sole possession of the key to progress. We have, to be sure, developed fruitful ideas and practices of which we have a right to be proud but others have not remained inactive and much important research has been, and is being, carried out in other countries.

The answer lies mainly in the fact that ours is a unilingual nation and that foreign-language communications are therefore not generally accessible to American readers. In most of the other sciences, including adult psychiatry, these limitations are taken care of by reviews and abstracts of the international literature. The purpose of this editorial outpouring would be served if our teachers and reviewers made it a point to look beyond the linguistic frontiers and to give our students and readers the benefit of familiarity with the work in child psychiatry done in other areas. It will then be easier to avoid the embarrassment caused by the question of a noted European child psychiatrist who asked: How do you explain that some of you Americans are so full of curiosity about the Rorschach responses of children in primitive cultures while there seems to be so little curiosity about the scientific productions of people engaged in the study of psychiatric problems of children in cultures so similar to yours?

L. K.

THE SUM OF PHILOSOPHY

Things happen.

—Aristophilus (Attrib.)

CORRESPONDENCE

FUNKENSTEIN TEST

Editor, THE AMERICAN JOURNAL OF PSYCHIATRY :

SIR : Having had experience with almost 2,000 Funkenstein tests, which we call the ANSR, "Autonomic Nervous System Reaction"(1), I would like to comment on the letters in the December issue of the Journal from Alberto DiMascio, and Manfred Braun, M.D.

In my experience and to my knowledge of the literature, no one has yet been able to utilize the Funkenstein as a prognostic agent in determining which tranquilizer or, for that matter, psychic energizer should be used. The basis of the test however, remains unaltered in that it is the only graphic means of putting the responses of the autonomic nervous system on paper, and having them fall into the 7 original categories, devised by Funkenstein.

One of the greatest difficulties in our experience has been the initial phase of the test when epinephrine is injected intravenously. It becomes rather a problem to estimate at which level the systolic pressure might rise in the next 30 seconds. Human error often leads to a false recording and sometimes the full significance of the test is lost. The second or Mecholyl phase of the test is not so dramatic and the response is less rapid and more easily plotted.

We have just received from England, equipment designed by H. J. Green, M.D. (2), Dept. of Physiology, Middlesex Hospital Medical School, London W 1, which is described as the "Winston Blood Pressure Follower." This provides a continuous recording of blood pressure with minimum discomfort to the patient and does not use the conventional arm cuff or arterial cannulation. A finger cuff instead is used and systolic pressure is recorded continuously on a dial in the front panel, on a sphygmomanometer and on heat sensitive chart calibrated from 0 to 300 millimeters Hg.

The equipment is mobile and can be used in hospitals or offices very easily. It offers the most accurate determination of systolic pressure of any equipment we have ever used and the accuracy of the charting is extremely close and in several tests which we have repeated, having been done first by the "manual technique," as opposed to the continuous recording technique, we have seen changes otherwise missed.

The Funkenstein test has great usefulness in our experience. We feel that 85% of the 2,000 tested show clear indications as to what type of therapy is indicated. With more and more use of psychopharmarceuticals and with perhaps less resource to the physiological treatments such as insulin coma and electro shock therapy, the need for diagnostic acumen is still important.

We feel that the test should be more widely used, and by correct interpretation many patients will be directed into the proper line of treatment and thereby avoid unnecessary exposure to ECT or insulin coma, tranquilizers or energizers, unless they are indicated by the physiological responses of the patient's antonomic nervous system.

Edwin Dunlop, M.D.,
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FUNKENSTEIN TEST

Editor, THE AMERICAN JOURNAL OF PSYCHIATRY :

SIR : May I be allowed to comment on the recent exchange of letters in your correspondence column in regard to the Mecholyl (Funkenstein) test.

The crux of the issue surely is the meaning of this test in the light of current knowledge, and here the weight of evidence must be considered to be against the original empirical proposition that the blood pressure responses to mecholyl are meaningfully related to the clinical status of psychiatric patients or their prognosis.

One may summarize this evidence by pointing out the following. First, a considerable number of studies dealing with the question of the prognostic value of the test have not been able to confirm that any relationship exists between the mecholyl test response and prognosis, or produced contradictory and mutually irreconcilable findings. Secondly, as we have shown (J. Nerv. & Ment. Dis., November 1958), the blood pressure responses to mecholyl vary from day to day even when the test is administered to the same patient by the same investigator and under similar experimental conditions. In our series, in which the mecholyl test was administered by the same investigator to individual patients on 4 different days within a period of one week, only in 8 such 4-test series out of 54 were the response patterns consistently identical throughout the 4 tests. Thirdly, as we have also shown in the same study, the blood pressure responses to mecholyl are actually dissimilar in a significant number of instances when read simultaneously from the right and left arms by two independent observers. One also ought to note that some mecholyl test responses are indeed such as to be unclassifiable into any of the usual response patterns (see among others, Canad. M.A.J. 77 : 116, 1957). The addition of an epinephrine test, which for all one knows may be equally variable, cannot conceivably alter the conclusions to be drawn from this evidence.

The acceptance of the Mecholyl test places a heavy burden on the psychiatrist. If he repeats the test for reassurance, he will find that the results many augur a different prognosis for his patient from one day to another even before treatment of any kind is instituted, and that, furthermore, the patient's right sided readings may point to a good prognosis while the simultaneously read left sided response may indicate just the opposite.

Hanus J. Grosz, M.D.,
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NEWS AND NOTES

Dr. Frederick W. Seward.—Dr. Seward, former owner and director of the Interpines Sanitarium, established by his father in 1890 and closed in 1958, died at his home in Goshen, N. Y., March 4, 1960. He was a graduate from the N. Y. Homeopathic Medical College (1898) and was a former president of the N. Y. State Anti-Saloon League, and had been an active campaigner in the cause of Prohibition. He had been a fellow of the American Psychiatric Association.

1960 Research Award Announcement.—The National Mental Health Research Fund of the Canadian Mental Health Association announces the second annual Research Award of approximately $22,000 available this year. It is the intention to award this amount to one research scientist in whose name it will be held and paid as a guaranteed monthly stipend over a 2 to 4 year period.

Applications are invited from persons in Canada with appropriate scientific qualifications in any of the professional disciplines directly related to mental health or mental illness. Applications should be made by informal personal letter setting forth the major research interests as well as the scientific background of the applicant, and should be sent not later than May 31st, 1960 to The Director, National Mental Health Research Fund, Canadian Mental Health Association, 11½ Spadina Road, Toronto 4, Ontario.

Third World Congress of Psychiatry.—Under the auspices of the Canadian Psychiatric Association and McGill University, the Congress will be held June 4-10, 1961, in Montreal, Canada. English, French, German, and Spanish will be the official languages. The program has been designed to include the many vital interests in psychiatry today. Those wishing to present papers should communicate with the General Secretary, Dr. Charles A. Roberts, Allan Memorial Institute, 1025 Pine Avenue West, Montreal 2, P. Q., Canada. A Second Announcement, to be released in September, 1960, will contain information about scientific films, registration, and accommodation.

Dr. Overholser Honored.—Dr. Overholser, Superintendent of Saint Elizabeths Hospital, Washington, D. C., was one of five to receive the President's Award for Distinguished Federal Civilian Service, the highest award the United States can give its career civil servants. Dr. Overholser was presented with the gold-medal award by President Eisenhower at the White House on March 8.

Cutter Lecturer at Harvard.—Dr. Benjamin Pasamanick, professor of psychiatry and research director of the Columbus Psychiatric Institute and Hospital, has been named the Cutter Lecturer in Preventive Medicine for 1960 at Harvard University. He is the first psychiatrist appointed to the lectureship established in 1909 in the will of the late Dr. John Clarence Cutter. Dr. Pasamanick will give two lectures on May 4 and 5 on epidemiologic approaches to the investigation of childhood neuropsychiatric disorder.

Annual Workshop in Projective Drawings.—The workshop, conducted by Emanuel F. Hammer, Ph.D., and Selma Landisberg, M.A., will be held at the New York State Psychiatric Institute, New York City, from July 25 to 28. The suggested text for preparation is *The Clinical Application of Projective Drawings*, Charles Thomas, publisher. Further information may be obtained from Miss Selma Landisberg, 166 East 35th Street, New York 16, N. Y.

Institute for the Study of Crime and Delinquency.—The formation of the Institute, 605 Crocker-Anglo Bank Building, Sacramento 14, California, has been announced by its new president, Richard A. McGee, Director, California Department of Corrections. Its first project is the International Survey of Correctional Practice and

Research, under the direction of Dr. Clyde E. Sullivan, with offices at 300 Mercantile Building, 2082 Centre Street, Berkeley 4, California.

AFTERMATH OF A FIRE ON A GERIATRIC WARD.—A 20% increase in death rate during 3 months following a fire on a geriatric ward of Topeka State Hospital is reported by Dr. D. R. Aleksandrowicz of that institute. In the emergency, most of the patients had been transferred temporarily to a vacant ward, those remaining being placed in other services. No physical injury to any patient resulting from the fire or evacuation was observed, and regular medical and nursing care was assured. It was thought that disruption of milieu and separation from familiar patient groups, personnel, and environment together with changes in routine and associated emotional reaction of personnel might be factors in the increased mortality. The patients involved were all suffering from advanced organic brain syndromes. These experiences emphasize the emotional needs of geriatric patients and the special features of nursing care they require; and it is suggested that on such a service the mortality (possibly also the morbidity) may be an index of emotional tension within the staff-patient community.

CANADIAN MENTAL HEALTH ASSOCIATION.—The Canadian Mental Health Assembly and 42nd annual meeting of the Canadian Mental Health Association will meet June 2-4, 1960, at the University of Alberta's Banff School of Fine Arts. Expected participants include Prof. Jas. Tyhurst of UBC, Prof. Paul Lemkau, Johns Hopkins U., Rev. Noel Mailloux, Dr. Keith Yonge, U. of Alberta, Miss Vivian Acord and Joseph R. Brown, Indiana Association for Mental Health, and Lawrence Linck, National Association for Mental Health. Further information may be obtained from the Conference Secretary, Canadian Mental Health Association, 11½ Spadina Road, Toronto 4, Canada.

ALDOUS HUXLEY APPOINTED SLOAN VISITING PROFESSOR.—Aldous Huxley, for the past year professor-at-large at the University of California, Santa Barbara, arrived at the Menninger Foundation School of Psychiatry, Topeka, Kansas, on March 15 to assist with the teaching of psychiatric residents for about 6 weeks. He is the twelfth visiting professor at Topeka provided for by a grant from the Alfred P. Sloan Foundation to The Menninger Foundation.

AMERICAN ACADEMY OF GENERAL PRACTICE.—Dr. Ruth B. Freeman, president of the National Health Council, announced the Academy's election to membership in the Council. The more than 26,000 Academy members, all of them physicians in the general practice of medicine and surgery, join the 70 other member organizations in the Council to work for health protection and improvement.

GALESBURG STATE RESEARCH HOSPITAL.—The 10th Anniversary Symposium on "Research Approaches to Psychiatric Problems" will be held October 21-22, 1960. The Symposium will survey many currently promising biological, psychological, and sociological methodologies relevant to the problems of mental health. Interested prospective participants are invited to communicate as soon as possible with Thomas T. Tourlentes, M.D., Superintendent.

SYMPOSIUM ON THE PSYCHOPHYSIOLOGICAL ASPECTS OF SPACE FLIGHT.—Outstanding authorities in psychiatry, physiology, endocrinology, and engineering will give papers at the forthcoming symposium on "The Psychophysiological Aspects of Space Flight." Sponsored by the School of Aviational Medicine, the meeting will be held at the Aerospace Medical Center, San Antonio, Texas, May 26-27, 1960. Southwest Research Institute is handling the arrangements. Lt. Col. Bernard E. Flaherty is the symposium chairman. The symposium proceedings will be published in the book form later this year. Further information may be obtained from Jack Harmon, Symposium Coordinator, Southwest Research Institute, P.O. Box 2296, San Antonio 6, Texas.

Training in Management of Psychiatric Problems of Children.—Boston University School of Medicine, Department of Psychiatry, in cooperation with Boston City Hospital, Department of Pediatrics, announces a training program in the management of emotional problems of children. The course is part-time and designed for practicing pediatricians and for all practicing physicians who are interested in problems of childhood. It is made possible through a grant from the Public Health Service, for training of physicians in psychiatry. For further information write to Box 1, Boston University School of Medicine, 80 East Concord St., Boston 18, Mass.

Argentine Society of Psychosomatic Medicine.—The Society announces the appointment of a new governing board. The newly elected president, Dr. Mauricio Knobel, is an APA member. The aims of the society, which meets monthly in Buenos Aires, is to encourage an exchange of scientific ideas throughout the world. Contacts should be made to Sociedad Argentina de Medicina Psicosomatica, Honduras 4135, Buenos Aires, Argentina.

Society of Biological Psychiatry.—The annual meeting of the Society will be held in Miami Beach, Florida on June 11-12, immediately preceding the clinical meeting of the American Medical Association. An interesting program has been arranged and the Academic Lecture will be given by Hans Hoff, M.D., Professor and Head of the Department of Psychiatry of the University of Vienna.

He has chosen for his subject: "The Role of Biological Treatment in Comprehensive Psychiatric Management."

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY, INC.

The American Board of Psychiatry and Neurology, Inc., and its Committee on Certification in Child Psychiatry, announce the certification of the following as Diplomates in Child Psychiatry.

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FINE THREADS

A man bade a spinner spin fine threads. The spinner span fine threads, but the man declared that the threads were not good and that he wished the very finest of fine threads.

The spinner said, "If those are not fine enough for you, then here are some others that will suit you." And she pointed to a bare spot.

The man declared that he could not see them.

The spinner replied, "The fact that you cannot see them proves that they are very fine ; I can't see them myself."

The fool was rejoiced, and ordered some more of the same thread, and paid down the money for it.

—TOLSTOY
(who was also looking
for fine threads).

BOOK REVIEWS

Symposium on Schizophrenia. Edited by *L. Lopez-Ibor.* (Madrid: Consejo Nacional De Investigaciones Cientificas, 1957, pp. 398.)

In this volume are published the lectures given at the Symposium on Schizophrenia held in 1955, at the Neuropsychiatric Clinic of the Madrid General Hospital, and sponsored by the National Research Council. It is edited by Dr. Lopez-Ibor, Head of the Clinic and initiator of the symposium. It is unfortunate that only the lectures are published; it would have been desirable to present the discussions as well. The volume contains 24 papers, delivered by 20 authors, of whom 8 were invited from outside of Spain: 2 Portuguese, one French, 2 Germans and 3 Swiss.

It is not possible, in this review, to summarize all 24 chapters. There is a wide range of content and also of quality, though most of the papers are of high calibre. Interesting for the American reader is that this volume gives clear information about the current trends of thought of the official psychiatry in Spain, of which so little is known in this continent.

Since the beginning of this century, Spanish medicine has been strongly influenced by Germany and this impact has been strongest on psychiatry. This symposium clearly shows that this adherence still persists very strongly. As an example it could be mentioned that neither E. Minkonsky nor Sechaye are quoted by any of the Spanish authors. Only the 2 French speakers invited, H. Ey and Ch. Durantd give credit to these authorities.

As shown by this book, contemporary academic psychiatry in Spain—with some exceptions—is descriptive, phenomenological and existential anthropological, closely following Jasper, K. Schneider, Wyrsch and Biswanger. No interest is shown in psychodynamics or genesis of symptoms. Schizophrenia is conceived as a "psycho-organic" process, a "somatosis" of endogenous origin. The basic manifestation is a "disturbance of the activity of the self," in terms of "being-in-the-world" that expresses itself by alterations of the emotional life which later become fixated in personality disorders (L. Ibor). Characteristically the only contribution devoted to psychotherapy is a chapter written by Ch. Durantd, the Director of "Les Rives de Prangins," Switzerland. There are, however, 4 dealing with the biological and physical treatments, including leucotomy and its technique.

As it is inevitable in such a collection, there is much overlapping and repetition. The reviewer feels that much of this could have been avoided if some of the authors could have indulged less in theoretical discussions and speculations of the literature, and concentrated in the discussions of their own opinions and conclusions as based on objective facts derived from their personal observations and research.

The non-Spanish psychiatrists are among the best known leaders of continental psychiatry; though all their contributions are very valuable, they deal with their already well known points of view, without adding anything essentially new to their conceptions. Two contributions to this symposium by Barahona and Polonio, both from Lisbon, should be mentioned; they deal respectively with acute schizophrenia, and with the different types of evolution of the psychosis.

The typographical presentation of the book is good. Unfortunately the great number and kind of misprints makes the reading at times very disturbing, for instance "chronic" instead of "clonic," "fusion" for "function" and so on. In addition to the general index of chapters, there is an excellent index of subjects and another of the authors quoted in the text.

On the whole, this is an excellent book that gives a quite complete idea about how the problems of schizophrenia are approached by an important group of European psychiatrists. Both the National Research Council of Spain and Dr. Lopez-Ibor deserve appreciation for the service rendered.

M. Prados, M.D.,
Montreal, P. Q.

International Review of Criminal Policy, No. 13, October 1958. (United Nations Publication.)

This volume contains another topical bibliography of current technical literature relating to the prevention of crime and the treatment of offenders. It is the most exhaustive review of its kind and its value is augmented by the inclusion of an author index.

The remainder of this issue deals with the question of prostitution. There are authoritative accounts of the existing situation in a number of selected countries.

K. G. Gray,
Toronto, Canada.

Dr. Kelly of Hopkins. By *Audrey W. Davis.* (Baltimore : The Johns Hopkins Press, 1959, xii + 242 pp. ills. $5.00).

Dr. Kelly was one of "The Four Doctors" who founded the Johns Hopkins School of Medicine, that opened its doors to students in 1893. Kelly was the youngest of the four, Osler the oldest. The first class included 15 men and 3 women, the Hopkins being the first school in the United States to admit women. By 1893 the faculty had grown from 4 to 15.

The original four—in order of appointment, Welch (pathology), Osler (medicine), Halsted (surgery), Kelly (gynecology)—have been immortalized in Sargent's splendid painting that hangs in the Welch Medical Library at the medical school.

It is a singular fact that ample biographies of the first three of the founders were written long ago, also biographies and autobiographies of numerous others of the early Hopkins staff ; Kelly alone, until now, had remained without the story of his life being told in book form. This is all the more remarkable because he was the most spectacular of the great Four and one would have thought that because of the unique features of his personality and his life he would have been the first to attract a biographer.

But Kelly had chosen the one who would tell his story, and one peculiarly suited to do so. Miss Davis was for twenty years his invaluable secretary, friend and collaborator and to her he bequeathed his private papers and the note books he had filled with his experiences and observations over the years. Besides there were the day-to-day conversations from which she quotes freely, as well as from a rich correspondence, the Hopkins archives and other sources. The result is a fascinating book. Writing it was a labor of love. In her pages Dr. Kelly still lives.

He was a born naturalist. From early boyhood he had ranged far and wide over the country collecting and studying specimens of all kinds, his chief delight being reptiles. He had wished to spend his life as a student of nature but yielded to his father's influence and turned to medicine as the more useful, not to say remunerative career. He remained, however, a devoted naturalist by avocation throughout his life.

From the first in his years of practice Kelly's main interest was gynecology, and here his exceptional talent was promptly apparent. He was but 31 years old and only 7 years out of medical school when he was called from Philadelphia to Baltimore to head the department of gynecology at the new medical school of the Johns Hopkins University ; and here he developed an unequalled operative pattern that made him famous throughout the world. So great was the demand for his services that he was obliged to establish a private hospital of his own near his residence to accommodate the patients that thronged to his clinic.

After 30 years as professor of gynecology he retired from the medical faculty, but continued with his numerous private interests, writing, lecturing, traveling and exploring nature and stocking his private museum and library. He performed operations until his eightieth year.

Kelly believed that the labourer is worthy of his hire and he was the only one of the Four Doctors who made money by practicing his profession. Rich patients were charged high fees—the standard figure for an obstetrical case was $500—but he also tempered the financial wind to the shorn lamb, and he refused no patient who could not pay. His charities of many kinds were extremely large. Not long after the medical school opened, expanded facilities became necessary, especially in the gynecological department. To meet this need Kelly wrote his personal cheque for $5,000 ; sometime later another contribution of $10,000. He gave several thousand books to the medical library. To illustrate his books he brought the distinguished German artist, Max Broedel to the Hopkins, and was thus responsible for establishing the first department of medical art with Broedel the first professor in the world of such a department.

The full title of Miss Davis' book is Dr. Kelly of Hopkins, Surgeon, Scientist, Christian. This may seem an extraordinary caption, but it is safe to assume that it is as Dr. Kelly would have had it. It is not impossible that he may have suggested the subtitle. It would be difficult to conceive of four giants of medicine, brought together to collaborate in launching a great medical school and hospital, each of whom differed so strikingly from the others in personal characteristics ; and yet whose separate undertakings fitted so congenially together in pioneering the heroic age of medicine, who glorified in each other's achievements, and as the years wore on manifested such strong mutual affection. But Kelly's personality contrasted with that of each of the other three particularly in his conspicuous, even obtrusive religious habits and practices. If ever there was a "God intoxicated" man it was Howard Kelly. Christian doctrine and belief had become an overmastering influence in his life from boyhood on. He recalled a youthful ex-

perience during an interlude in his medical course, spent on a western ranch. On a winter's night, bedfast with snow blindness in the course of a three-day blizzard "there came as I sat propped up in my bed an overwhelming sense of a great light in the room and of the certainty of the near presence of God, lasting perhaps a few minutes and fading away, leaving a realization and a conviction never afterward to be questioned, . . . a certainty above and beyond the processes of human reason."

On the night of the day he graduated in medicine the young physician noted in his diary : "I dedicate myself—my time—my capabilities—my ambition—everything to Him. Blessed Lord, Sanctify me to Thy uses. Give me no worldly success which may not lead me nearer to my Savior."

Later, at the Hopkins his religious views were so contrary to those prevailing among the staff that his colleagues wondered how so brilliant a man could harbor such beliefs. Finally they gave it up ; he was an enigma. Kelly began and ended every day with an hour of bible study and prayer. "Never," writes his biographer, "did Kelly pick up a scalpel without prayer that his hand be guided. . . ." Riding in a taxicab, when halting at a red light he would introduce some earnest remarks with "Cabby, I hope when you and I come to the gate of heaven, the light will be green."

Dr. Kelly died in January 1943 six weeks before his eighty-fifth birthday. He was the last of the Four Doctors to go. His last words : "My Bible, Nurse, give me my Bible." There seems to be no question that he firmly believed in immortality. In his last textbook, *Gynecology*, finished at the age of 70, Kelly wrote : "My pleasant task is done ; the shadows fall well aslant my page ; it is almost time to draw the curtains and turn on the Great Light."

Dr. Kelly's seventy-fifth birthday was the occasion of a great gathering of his friends and colleagues for a testimonial dinner. Welch, the only other survivor of the immortal Four, lay mortally ill in the Johns Hopkins Hospital. He sent a letter, one of the great letters of all time, in which he happily and touchingly reviewed "forty-four years of our uninterrupted association, friendship and affection and love." And then, as part of his tribute, "I have always felt, as did Osler, that you did more than any of us to extend the fame of the Johns Hopkins University to distant parts ; and the hospital offered no greater attraction than the opportunity to see you and your work, and the new methods which you were so rapidly developing."

A year later Welch was gone. Speaking of his cherished friend Kelly said, "It is very sad and strange that at the end, Christian faith demands some expression of hope. He was so lovable that I hope some light entered before the end." (!)

C. B. F.

Clinical Studies in Culture Conflict. Edited by *Georgene Seward, Ph.D.* (New York : Ronald Press Co., 1958, pp. 598. $7.00.)

This book is a product of the University of Southern California, where Dr. Seward is associate professor of psychology. It is a sequel to the editor's *Psychotherapy and Culture Conflicts* (New York : Ronald Press, 956), in which she presented the principle psychological differentials among certain ethnic groups. The current volume illustrates in greater length and detail how these psychological factors influence personal-functioning and psychotherapy.

Consisting of a series of case studies involving conflicts associated with ethnic minority groups, this work shows the value of a multidisciplinary approach to current problems in the social sciences. There are 22 chapters, written by 20 clinical psychologists, 3 psychiatrists, and 2 anthropologists. In order to integrate the material the editor has written a brief preview and postscript for each of the 5 major sections. Part One has an introductory chapter by the editor, in which she discusses various personality features and culture conflicts ; the second chapter is devoted to methods of diagnostic evaluation and testing. Part Two, a collection of case studies relative to the Negro's role in this country, presents the Negro as having the greatest problems and the most extreme form of ambivalence because he lacks a specific sub-culture of his own. Part Three deals with the American Indian, while Part Four treats of the various groups having a Spanish legacy, such as Mexican-Americans, Puerto Ricans, and Filipinos. Part Five is devoted to the Japanese-American, and the concluding part deals with the Jews and Armenians of European background.

The book strongly suggests that the human raw material does not differ with culture or sub-cultures, but that each individual culture tends to select and develop certain aspects of the total potential personality. It is emphasized that the therapist must increase his sophistication about cultural backgrounds in order to give the best care to his patients.

Psychotherapists of all schools of thought will find this work helpful in the specific areas mentioned above.

ERIC T. CARLSON, M.D.,
New York Hospital-
Cornell University
Medical College.

DER GANGSTER. By *Hans von Hentig.* (Berlin : Springer-Verlag, 1959, pp. 245. DM 19.80.)

Dr. von Hentig is a psychologist-sociologist, and in the present volume offers a criminal-psychological study of the American gangster. It is a fascinating book, and at the same time a shocking one. The political and social corruption that makes the gangster possible is revealingly uncovered in these pages, although this is by no means the main task of the author. It sounds, or rather, reads even more depressingly in German than it does in English, that one gangster "In 44 Jahren seines Lebens war der Gangster 44mal verhaftet worden und jedesmal freigekommen" (p. 220). This is a familiar pattern. Our outmoded penology, and our antiquated approach to the criminal are painfully apparent when one reads a book like this. But Dr. von Hentig's purpose is not to reform but to understand—an indispensable condition or prerequisite for anyone interested in reform, and so his inquiry is aimed principally at discovering the characteristics of the gangster. He considers the genealogy of the gangster, his cultural milieu, his women, the functions and operations of the gangster, his defensive techniques, his bodybuild, his so-called primitive drives, his infantilism, his intelligence and related traits, his superstitions and symbolic behavior, attitudes toward death, and the like.

Dr. von Hentig occasionally falls into some unexpected naivetes, as in his belief in "throwbacks" and "atavisms," beliefs which belong in the same class as "phlogiston" and "ghosts." In fact, there is a little too much of this, and this rather spoils an otherwise valuable book. It is not going to help us very much to be told, as Dr. von Hentig finally concludes, "This, then, is the gangster. A manicured savage, clothed by the best of tailors. The cannibal with the cadillac. The Stone Age Man in our midst, the barbarian in his deepest heart, and the beast of prey in his blood." Nevertheless, Dr. von Hentig has written a socially, if not psychologically, valuable analysis of one aspect of the contemporary social scene.

ASHLEY MONTAGU, PH.D.,
Princeton, N. J.

GROUP PSYCHOTHERAPY : THEORY AND PRACTICE. 2nd. Ed. By *J. W. Klapman.* (New York : Grune and Stratton, 1959, pp. 281. $6.75.)

The second edition of this useful book is a comprehensive, well balanced survey of the history, current theoretical concepts and major forms of practice of group therapy. About a third of the book is devoted to an historical survey and review of theoretical concepts. The latter are drawn chiefly from psychoanalysis and group dynamics. The remainder describes all the major current forms of group therapy. Each method is fairly presented, with supportive illustrations. They are arranged roughly in terms of amount of directiveness, on the assumption that this parallels the degree of disorganization of the patients for which each is most suited. The more disorganized the patient, the more explicit the direction he needs. Two brief chapters at the end, which give the impression of being tacked on for completeness, consider assessment of the results of therapy and milieu therapy. The former is hopelessly inadequate ; the latter, though brief, is sufficient in view of the fact that many aspects of milieu therapy had been treated in earlier chapters.

Perhaps the outstanding feature of this book is its general good sense. The author rightly maintains that successful psychotherapy must engage intellectual as well as emotional aspects of the patient's personality and stresses the re-educative aspect of all forms of psychotherapy. While there is nothing in the book that is startling, original, or incisive, neither is there anything that is biassed or unfair, and the author's wide clinical experience is evident in his evaluations throughout. There is an adequate bibliography.

This book will be of the greatest use for persons who desire a sound general orientation to the field of group therapy. In its unpretentiousness, good common sense and clinical acumen, it is a fitting monument to its author.

JEROME D. FRANK, M.D.,
Baltimore, Md.

MOTIVATION : A SYSTEMATIC REINTERPRETATION. By *Dalbir Bindra.* (New York : Ronald Press, 1959, pp. 361. $5.50.)

For the clinical psychiatrist it is likely that only a few parts of this book will be of interest. The chapters on the nature of the problem of motivation, on motivational phenomena and on human motivation present the theoretical and experimental issues of the subject in a terse, condensed way. For the theoretician an ex-

perimental psychologist or psychiatrist the entire book offers a resumé of the data and arguments in a manner which is quite useful. The topics, in addition to those mentioned, are on goal direction, the development of motivation activities, an analysis of reinforcers, the factors determining habit strength, the role of sensory cues, arousal and behavior and the role of blood chemistry.

The book is restricted to phenomena that are "purposive" or "goal-directed"; all old experimental data are reinterpreted in the light of newer hypotheses and the up-to-date experimental data on animals leading to modern theories gives the author the opportunity to evaluate the new theories. He rejects instinct theory and drive theory as redundant descriptions which are not explanatory. He is also dissatisfied with the "neurologizing" of some experimenters.

The attempts at making psychoanalytic theory an overall psychological system did not seem to attract Bindra even though he deals with identical, if not parallel, phenomena. For example, he discusses "functional autonomy" but only the experimental data on animals involved and not the psychoanalytic theory.

Those students and researchers accepting Bindra's approach will find the book most useful as a reference source and as a systematic attempt to clarify the issues; those whose approach is different will have to answer the questions he raises in the polemic part of his book.

NORMAN REIDER, M.D.,
San Francisco, Calif.

A MANUAL FOR EEG TECHNICIANS. By *Rhoda Feinstein Milnarich.* Foreword by *Robert S. Schwab.* (Boston, Mass.: Little, Brown and Co., 1958, pp. 222. $5.50.)

This 222 page book with 83 illustrations fills a gap in an area which has not been covered since Ogilvie's *Manual of Electroencephalography* of 1945. It is written essentially to help the technician become oriented to the job and also improve the technique of taking an electroencephalogram which demands skill and patience. The book explores the difference in the role between technician and electroencephalographer as well as the various methods on taking an EEG. It plods a middle course in areas which are some times obscured by more heat than enlightenment.

The importance of the relationship between patient and technician is given sufficient attention. The chapter on artifacts is especially helpful and the succinct chapter on electronics provides easily assimilated facts about electrical aspects of the EEG.

A variety of very practical suggestions are given in the book; *i.e.*, what to do and how to describe a seizure during an EEG, how to add to the medical history for the electroencephalographer. A glossary of terms in the back of the book adds to its usefulness. For the beginning technician this book is very helpful and it is a worthwhile addition to the EEG lab.

A. N. BROWNE-MAYERS, M.D.,
New York, N. Y.

GRUPPEN PSYCHOTHERAPIE. By *Zerka T. Moreno, et al.* (Bern: Hans Huber, 1957. $4.00.)

This is a series of 20 papers, 5 of them in English. The other 15 are in their original language, mainly German or French. Brief English abstracts are included. The articles are fairly general in interest. The English articles include one by George Bach presenting his field theory which is a variant on Kurt Lewin with considerable elaboration and some rather general illustrations. Nathan Ackerman's paper discusses the historical and social origin of group psychotherapy with some emphasis on the failures of psychoanalysis. Rudolf Dreikurs has an article about the relationship of group psychotherapy to the democratic process which defines the psychotherapeutic group as a relationship between equals. W. Schindler of London is more concerned with the fact that group psychotherapy has strong resemblances to a recapitulation of the original family group and his belief that the transference problems are identifiable in this pattern. Mrs. Zerka T. Moreno presents a paper on case work with psychodrama as utilized with pregnant mothers. Several of the abstracts are intriguing. The German authors have presented several formulations of the dynamics within the group but in general there is little which has not been in the English literature before this time. Both J. L. Moreno and Martin Grotjahn have written papers in German for this periodical but again there seems to be little which differs from their previous formulations.

CARL A. WHITAKER, M.D.,
Atlanta, Ga.

A HISTORY OF EMBRYOLOGY. By *Joseph Needham.* (New York: Abelard-Schuman, 1959, pp. 304. $7.50.)

This is the second revised edition of a book originally published in 1934. At that time the

work established itself as the leading *arbeit* of its kind, and now, with the assistance of Arthur Hughes, lecturer in anatomy at Cambridge, the work has been brought up-to-date and enlarged. It is a most welcome revival of a book that has been too long out of print, for it is one of the most readable of books, and certainly the most informative on the subject with which it deals. It is not only a valuable contribution to the history of science, but quite as eminently so an illuminating history of the force with which culture conditions thinking.

ASHLEY MONTAGU, PH.D.,
Princeton, N. J.

THE GROWTH OF LOGICAL THINKING FROM CHILDHOOD TO ADOLESCENCE. By *Bärbel Inhelder* and *J. Piaget*. (Translated by *Anne Parsons* and *S. Milgram*.) (New York : Basic Books, 1958, pp. 356. $6.75.)

The first part of this book consists of a series of experiments by Inhelder, each followed by a theoretical analysis by Piaget. The analyses and the final 3 chapters represent an attempt to interpret the experimental (or, rather, observational) data in terms of Piaget's theory of the development of thinking from childhood to adolescence.

The book is not easy to follow for several reasons. In the first place, it presupposes some knowledge of Piaget's earlier work on cognitive development, some acquaintance with his views on the relationship of psychology and logic, and some familiarity with the symbolism of formal logic. There is a helpful introduction by one of the translators which briefly sets the stage for the reader ; even so, readers unfamiliar with Piaget's writings will find this a difficult book.

A second difficulty arises from Piaget's use of familiar technical terms in unfamiliar ways. For example, in Piaget's system the term "operation"—a key concept in Piaget's presentation—has a specialized meaning quite unlike that assigned to it in current North American psychology. For Piaget, concrete operations are actions that are "internalized," "integrated with other actions to form general reversible systems," and "accompanied by an awareness on the part of the subject of the techniques and coordinations of his own behavior." The focus of the book is on the transition from reliance on concrete operations, characteristic of children between 7 and 11 years of age, to the utilization of formal operations, apparent in the thinking of adolescents. Whereas concrete operations are related to the logic of classes and relations, formal operations are related to propositional logic. Ability to think in terms of propositional logic (for example, to recognize what conclusions may be drawn from certain premises) appears, according to the authors, only at about the age of 12 years.

A third difficulty facing the reader is primarily a methodological one. A psychologist accustomed to statistical analyses of experimental findings is likely to feel dissatisfied and baffled by the authors' presentation of data. Each of the first 15 chapters describes an experiment in which the subjects are set a task, the solution of which is based on a simple scientific principle, *e.g.*, the equality of angles of incidence and reflection, the conservation of motion in a horizontal plane. A description is given of the behavior of subjects at various stages of development, illustrated by sample protocols. One cannot tell, however, how many subjects were tested at each age level ; nor is there any clear indication of the amount of variability found among children of any one stage of development. Consequently, there are problems in interpretation. One may suspect, for example, that differences between Piaget's stages of development are not as clear-cut as the book sometimes seems to suggest. The data, as presented, do not allow the reader to check suspicions of this kind.

The importance of the book resides largely in Piaget's presentation of a set of logical schemata to assist in the study of thinking as a psychological process. Since it concentrates on the stage of development at which formal operations first appear, the book allows Piaget to expound and illustrate his system more fully than he has done elsewhere. Moreover, the ingenious series of studies by Inhelder can hardly fail to stimulate further research and to lead to an increased interest in Piaget's attempt to provide a theoretical framework for the study of thought processes.

RICHARD H. WALTERS, PH.D.,
University of Toronto.

THE ORIGIN OF SPECIES. By *Charles Darwin*. Edited by *Morse Peckham*. (Philadelphia : University of Pennsylvania Press, 1959, pp. 816. $15.00.)

This year, 1959, is the centennial of the publication of Darwin's *Origin of Species*, a centennial which is being celebrated all over the civilized world. During Darwin's lifetime 6 editions of the work were published, and while it was known that the author had made many changes between the first and the sixth edition no one really had an idea as to how extensive these changes were. This lacuna is now filled by Professor Peckham's prodigious industry. We have now, for the first time, a

complete variorum text in which variants down to a single comma are recorded from edition to edition in such a manner that within a few minutes the inquirer is able to determine how any particular word or sentence varies from edition to edition. The text of the *Origin* is not here, that would have swelled the volume to enormous dimensions, but anyone having a copy of any edition of the text can use Professor Peckham's admirable work to check on the changes. To students of the mind of Charles Darwin and his development, as well as to scholars of Darwiniana and Darwinism the book will be invaluable.

ASHLEY MONTAGU, PH.D.,
Princeton, N. J.

WE CALL THEM CRIMINALS. By *Ralph S. Banay.* (New York: Appleton-Century-Crafts, Inc., 1959, pp. 291. $3.95.)

Presenting the complexities of criminal behavior as illuminated by the motivational insights of dynamic psychiatry in a short, readable book, is an impossible task. Doctor Banay tackles it with courage, conviction and a wealth of experience in the correctional field. He reviews for his lay reader such characteristics of our culture as the preoccupation with violence and the movement toward a matriarchy. He gives a short course in the vicissitudes of child rearing and an introduction to general psychodynamics. Alcoholism is singled out for special attention because of its contribution to antisocial behavior. The theme is that man is manifestly weak, finite and fallible. Each individual has antisocial impulses that are normally held in control. Criminal behavior represents a surrender to human defects and frailty. Very little crime is attributed to mental illness as such, but is the result of a violent aggressive discharge in an emotionally unstable individual. A series of short interesting case histories is used to illustrate the above. Treatment techniques are dealt with extremely briefly in a chapter entitled, "Uses and Abuses of Brain Washing." I would have personally preferred a more straightforward presentation of treatment without the easily misunderstood analogy.

The final chapter, "A Program for the Future," is a good authoritative statement of perhaps the most popular approach of psychiatrists to the penal problem. It recommends abolition of prisons as such with their obsolete philosophy, frame of reference, physical plants and personnel practices. In their stead, two types of institutions should be planned. One would be a protective work colony for the untreatables and the other would be a full-fledged therapeutic institution blending characteristics of hospital, school and workshop.

While one can take exception with Doctor Banay about his model for criminal behavior and his recommendations for correction, there certainly can be no disagreement with his desire to force the general public to consider the intricacies of motivation of criminal behavior.

FRANK T. RAFFERTY, M.D.,
Salt Lake City, Utah.

THE TEACHING AND LEARNING OF PSYCHOTHERAPY. By *Rudolf Ekstein,* and *Robert S. Wallerstein.* (New York: Basic Books, Inc., 1958, pp. 334. $6.50.)

This book represents the distillation of nearly 10 years of experience in teaching psychoanalytic psychotherapy at The Menninger School of Psychiatry. The focus throughout is upon teaching and learning psychotherapy, a human enterprise which takes place within the limitations imposed by the fallibility of teacher, student, patient, administrator, and the sociopolitical structure of the training situation. In keeping with the title, examples from different points in the treatment-supervisory process are presented and are diagnosed and discussed in terms of problems in the teaching and learning of psychotherapeutic skills.

This important and well-written work terminates with a carefully selected bibliography on training in the different clinical disciplines.

BERNARD LUBIN, PH.D.,
Indianapolis, Ind.

IN MEMORIAM

RICHARD SHERMAN LYMAN
1891-1959

Dr. Richard Sherman Lyman, former Chairman of the Department of Neuropsychiatry, Duke University School of Medicine, died at his home in Montclair, N. J. on June 13, 1959, at age 68. A descendant of Richard Lyman, one of the founders of Hartford, Connecticut, Dr. Lyman was born into a Hartford family long noted for their mathematical and musical ability. He graduated from Yale in 1913; then enrolled at M.I.T. as a sanitary engineer, leaving before graduation to join a Red Cross typhus unit in Yugoslavia. He entered Johns Hopkins University School of Medicine in 1915, withdrew at the end of his second year to enlist in the Army Air Corps. Two years later he returned to medical school, earning both Phi Beta Kappa and Alpha Omega Alpha keys and graduating in 1921. He interned at Henry Phipps Psychiatric Clinic, then continued training at Brouwer's clinic in Amsterdam and at Queens Square Hospital in London as a clerk of Gordon Holmes.

Returning to this country, Dr. Lyman was appointed the first Associate Professor of Medicine at the newly organized medical school in Rochester, New York. In 1930, he attended Speilmeyer's clinic in Munich. A polyglot who spoke Russian and German without an American accent, Dr. Lyman was also one of the few Americans to have been an associate of Pavlov, at the Institute of Experimental Medicine in Leningrad. He then served at the Red Cross Hospital in Shanghai during the Sino-Japanese War of the early 1930's. During the next 5 years, as Associate Professor of Neurology and Psychiatry at Peking Union Medical School, Dr. Lyman established the first modern psychiatric hospital under the auspices of the college; developed the first tests for aphasia in Chinese; and compiled the first treatise on ethnologic neurology and psychiatry (Peking: Henri Vetch, 1939). Many of his important contributions, including negation of Pitres' "law of regression,"[1] were published in the *Chinese Medical Journal.*

On returning to the United States in 1937, he was appointed Lecturer at Johns Hopkins University School of Medicine, where he collaborated with Dandy on the use of the EEG as a diagnostic aid in locating brain tumors, and penned the first paper on eye movements and the EEG. Dr. Lyman maintained a close association with Adolf Meyer; but did not wish to succeed him as Henry Phipps Professor of Psychiatry, considering himself far too individualistic.

Finally in 1940 he accepted the post of first Professor of Neuropsychiatry and Chairman of that Department at Duke University School of Medicine, the first professor of neuropsychiatry in North Carolina. His department was subsidized out of his own pocket to finance noted guest lecturers from all over the world as part of his residency training program. Dr. Lyman purchased the Scholz neuropathological collection and gave it to the Armed Forces Institute of Pathology *via* Webb Haymaker.

He took a leave of absence from Duke to serve in Washington, D. C.; Ceylon; and China as a major in the Office of Strategic Services. Many of his experiences were later compiled as a section in *Assessment of Men* (Rinehart, 1948)—the selection of highly qualified personnel for O.S.S.

After resigning from Duke in 1951, Dr. Lyman became Visiting Professor of Neuropsychiatry at Meharry Medical College in Nashville to spearhead the foundations for a department. Following his retirement in 1955, he moved to Montclair.

For many years Dr. Lyman was a con-

[1] Pitres assumed that the earliest learned or the most fluent language was always the one least affected or first to recover in aphasia. However, Lyman was able to demonstrate that language structure itself is a more crucial factor—those languages allowing better connections with intact auditory and motor-speech functions showing less impairment.

sultant and advisor in the Veterans Administration teaching program. Among the many organizations to which he had belonged were the American Psychiatric Association, American Neurological Association, Chinese Physiological Society, and Sigma Xi. He was certified in both neurology and psychiatry by the American Board.

An expert craftsman who turned out detailed brain models in colored plastic to supplement his teaching, Dr. Lyman was one of the first psychiatrists in this country to compile a library of coordinated tape recordings and movies or film strips of important teaching cases, both in neurology and psychiatry, beginning in the 1930's. This is one of the most extraordinary and complete libraries of its kind. His perfect pitch enabled him to analyse tape recordings of the most subtle deviations with aphasic patients.

Unfortunately, due to modesty, his many other accomplishments were little known outside of a relatively few individuals, among whom are Tracy Putnam, H. Houston Meritt, John F. Fulton, Webb Haymaker, David McK. Rioch, Daniel Blain, William Sargent, R. Burke Suitt, and Leo Alexander (who was one of those Dr. Lyman "brought over" to this country). He is survived by his wife, Mrs. Katharine R. Lyman, who also served in O.S.S.; a daughter and son by a first marriage; and three sisters.

Of greatest importance in the present climate of doctrinaire putative certainties and conformity was Dr. Lyman's unique philosophy of teaching, original thinking, respect for individuality, and ability to empathize with patients that he tried to pass on to his students.

Perhaps the late Alan Gregg summarized these qualites in a letter to Dr. Lyman: ". . . You have a gift of stimulating and securing the loyalty of young men that is very valuable indeed."

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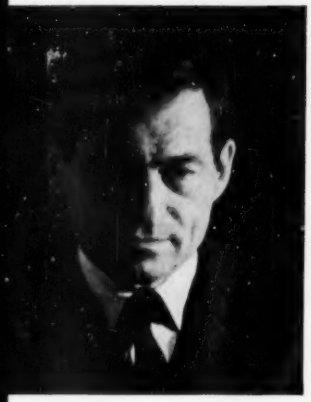

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THE FIRST FIVE MINUTES

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CHARLES F. HOCKETT, PH.D., *Professor of Linguistics and Anthropology, Cornell University*

JOHN J. DANEHY, M.D., *Assistant Professor of Psychiatry, State Univ. of N. Y., Upstate Medical Center*

Close Analysis . . .

At the heart of the book is a section of about 120 pages with an unusual format: Each page is cut horizontally into an upper part and a lower part, "Dutch door" style, so that the two parts can be turned independently. This device is for the reader's convenience. He will frequently want to make cross-reference from the material printed below to that printed above.

On the upper parts appears what the writers call a *transcription* of the five minutes of interview with which they deal. Directly below the transcription, but also on the upper page-parts, appears a *transcript* of what the participants in the interview say: that is, just what a stenographer would produce, in ordinary English spelling. The *transcription* represents *all those audible items that ordinary English spelling omits:* the pronunciation of the successive words, the intonation, the location and duration of pauses, hems and haws, sighs, gasps, coughs and throat-clearings, and such variables as rate of speech, register, volume, and tone-quality. The symbols and conventions of the transcription are explained in a separate chapter.

On the lower page-parts appears the authors' *analysis* of what is going on during the interview.

One reader's comments . . .

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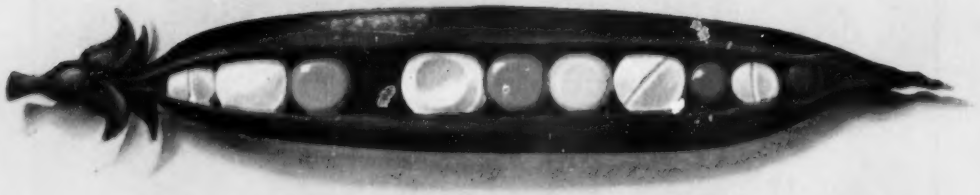

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*Ostfeld, A. M.: Scientific Exhibit, American Academy of General Practice, San Francisco, April 6-9, 1959.

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References: 1. Taylor, I.J.: Clin. Res. Notes 2:1 (Aug.) 1959. 2. Morrow, L.L.: Clin. Res. Notes 2:8 (Aug.) 1959. 3. Darling, H.F.: Dis. Nerv. System 20:167 (April) 1959. 4. Niswander, G.D., and Karacan, I.: Dis. Nerv. System (In Press). 5. Freed, J.E.: Clin. Res. Notes 2:12 (Aug.) 1959. 6. Weiss, I.I.: Clin. Res. Notes 2:12 (Aug.) 1959. 7. Stevenson, L.E.: Clin. Res. Notes 2:10 (Aug.) 1959.

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1. Ayd, F. J.: Clin. Med. 6:387, 1959. 2. May, R. H.: Am. J. Psychiat. 116:360, 1959. 3. Brock, S. (Moderator): Bull. New York Acad. Med. 32:202, 1956.

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1. Wilcox, F.: Prochlorperazine in Hospitalized and Private Psychiatric Patients, Dis. Nerv. System 19:118 (Mar.) 1958.

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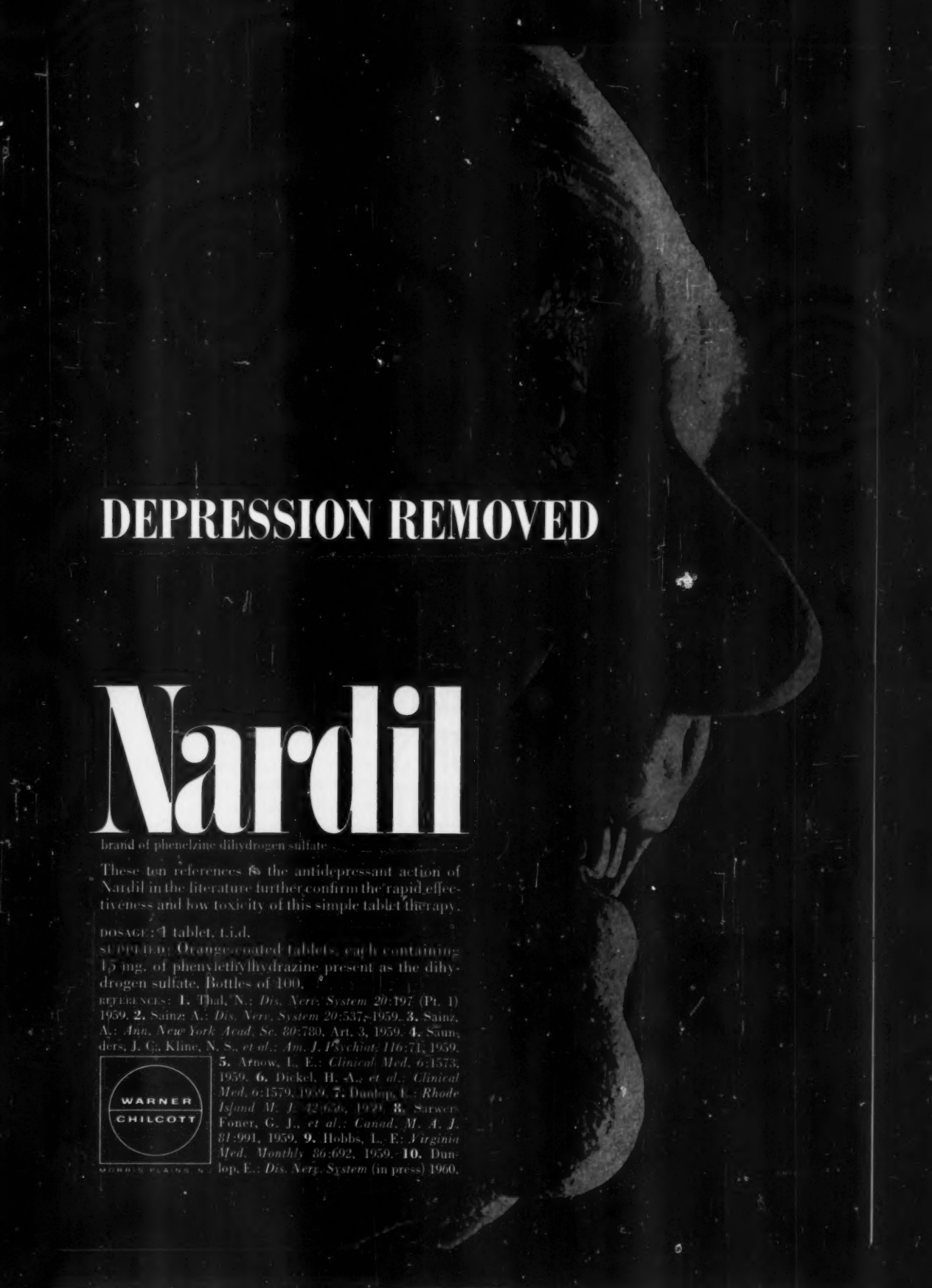

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REFERENCES: **1.** Thal, N.: *Dis. Nerv. System* 20:197 (Pt. 1) 1959. **2.** Sainz, A.: *Dis. Nerv. System* 20:537, 1959. **3.** Sainz, A.: *Ann. New York Acad. Sc.* 80:780, Art. 3, 1959. **4.** Saunders, J. C., Kline, N. S., *et al.*: *Am. J. Psychiat.* 116:71, 1959. **5.** Arnow, L. E.: *Clinical Med.* 6:1573, 1959. **6.** Dickel, H. A., *et al.*: *Clinical Med.* 6:1579, 1959. **7.** Dunlop, E.: *Rhode Island M. J.* 42:650, 1959. **8.** Surwer Foner, G. J., *et al.*: *Canad. M. A. J.* 81:991, 1959. **9.** Hobbs, L. E.: *Virginia Med. Monthly* 86:692, 1959. **10.** Dunlop, E.: *Dis. Nerv. System* (in press) 1960.

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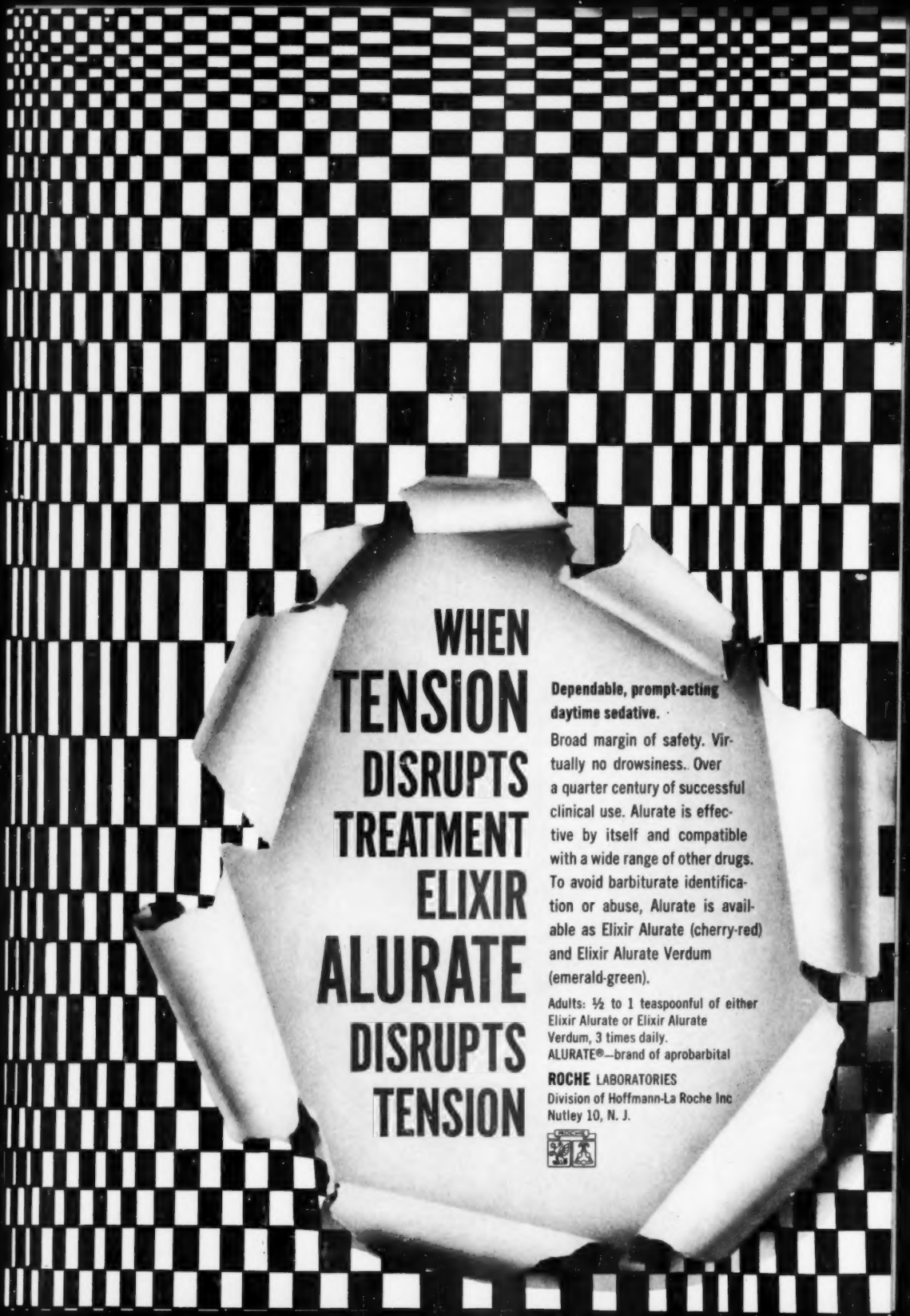
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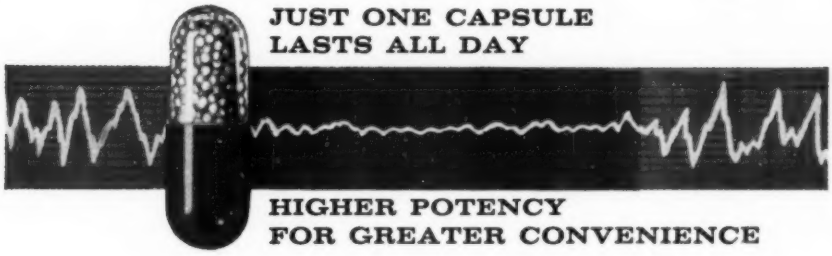

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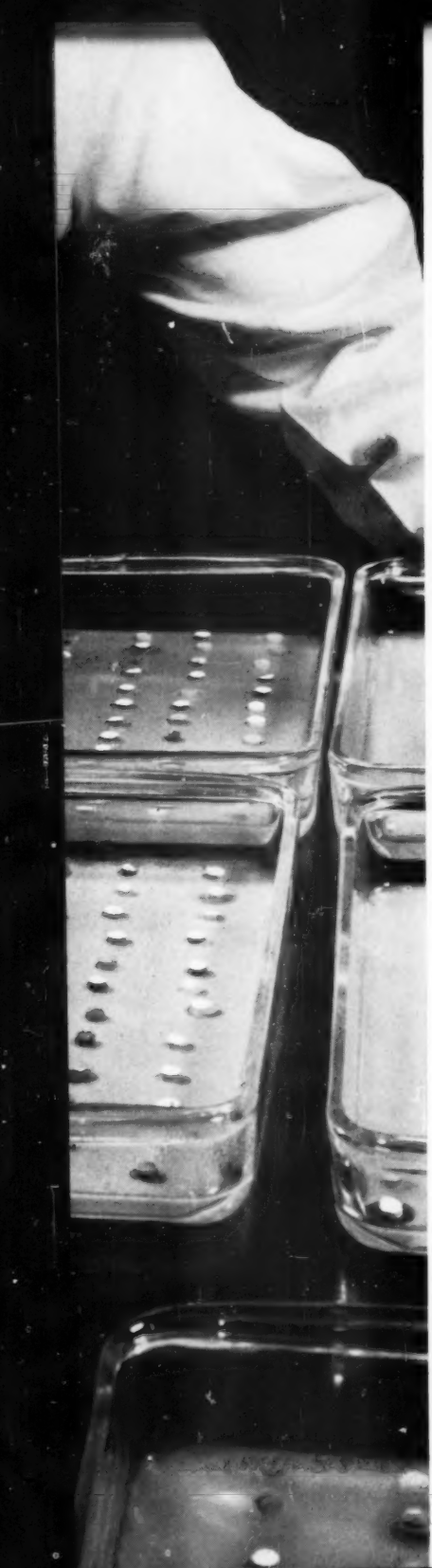

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1. Oswald, W.J.: Int. Rec. Med. 172:743 (Dec.) 1959. 2. Ehrmantraut, W., et al.: Scientific Exhibit, District of Columbia Medical Society (Nov. 24) 1958, Washington, D.C.

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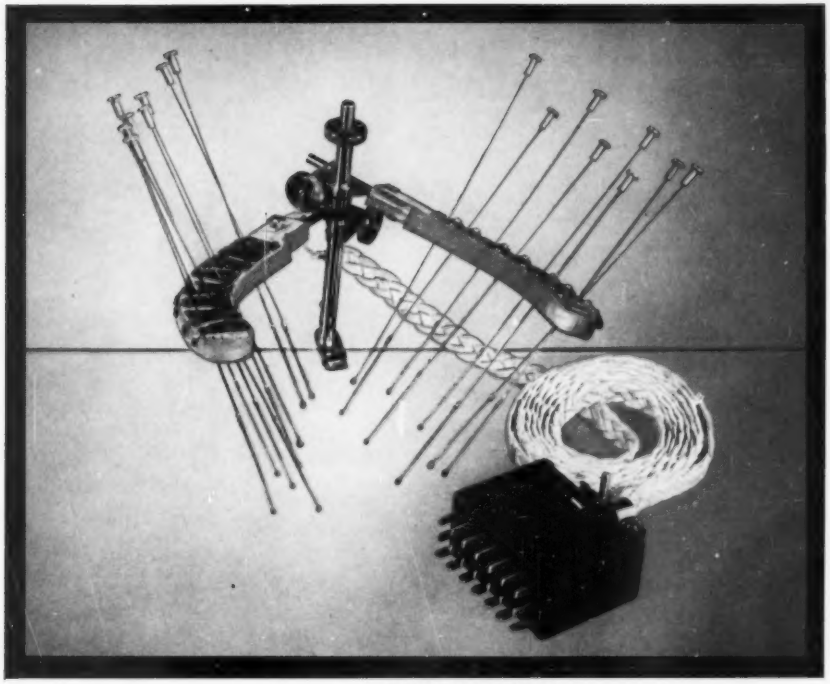

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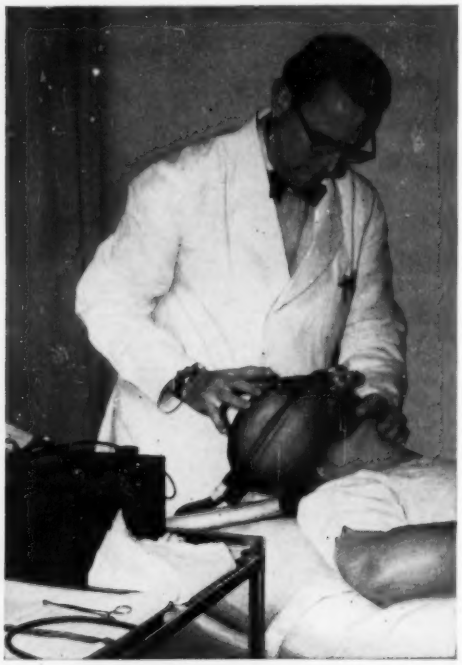

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On these pages are presented some pertinent pharmacologic and clinical data documenting

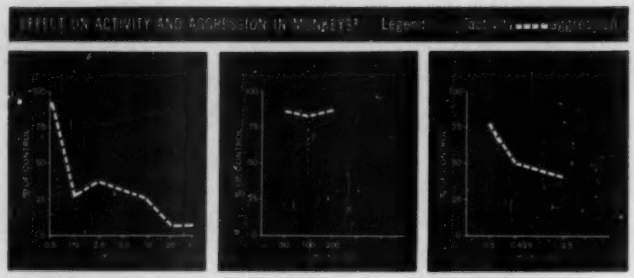
NEW LIBRIUM

the successor to the tranquilizers

PAGES FROM A LIBRIUM NOTEBOOK

Calming and taming effect of Librium on rats, monkeys and mice

Calm but alert, Librium-treated monkey offers striking contrast to "doped-up" appearance observed with reserpine and phenothiazine derivatives.



LibriumT.M. Aggression dramatically reduced; **level of activity normal**

Meprobamate No decrease in aggression; slight reduction of activity

Chlorpromazine Aggression reduced; **precipitous decrease in activity**

Stereotaxic instrument is used to locate septal area in rat brain. Anesthetized animal is trepanned; electrocautery destroys septal area; wound is closed with clamps.

Rage reaction of septal rats is elicited by three tests: (1) blowing air on animal's back; (2) lifting tail with forceps; (3) prodding with stick. Untreated controls do not react to these tests.

Technician holds Librium-treated septal rat in bare hand—an act which would cost him a finger without the aid of Librium.

Mice fight each other furiously under stimulus of mild electric shock administered through bottom of cage. Librium-treated animals fail to show hostility.

PAGES FROM A LIBRIUM NOTEBOOK

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the successor to the tranquilizers

successor in scope

Librium covers the entire meprobamate range of therapy[8,9] plus a significant portion of the phenothiazine area[9] plus the difficult middle ground between the two.[8] Librium is effective in obsessive-compulsive neuroses which previously have defied drug treatment.[3,4,7,8,17] Librium has a profoundly beneficial effect on depression,[3,6,11] particularly the agitated type.[1,7,9]

successor in safety

Librium "...has been shown to have a margin of safety greater than meprobamate...."[17] Librium lacks the autonomic blocking effects of chlorpromazine and reserpine.[17] Librium is devoid of phenothiazine toxicity;[8,17] free of extrapyramidal complications;[17] not encumbered by the depressions that often follow reserpine.[8]

successor in effect

Librium, in addition to relieving anxiety, produces a feeling of well-being, increased drive and a broadening of interest. Librium appears the biggest step yet toward "a pure neuroleptic or 'easing' action totally distinct from a central sedative or hypnotic one."[16]

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Librium is more than replacement therapy. It is not a substitute for, but quantitatively and qualitatively superior to, older tranquilizers and "equanimity-producing" drugs. Librium is of particular value:

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in more severely disturbed patients, including cases of agitated and reactive depression, fears, phobias, obsessions and compulsions ("...its spectrum of activity envelops and extends well beyond that of meprobamate and into certain indications for which the phenothiazines are prescribed"[9]).

the trouble-shooter who had troubles of his own

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The ulcer pain struck with particular severity between meals. A variety of medicaments provided no real relief. On the contrary, during the past two years, his condition had actually worsened; now the pain also hit him night after night—without letup.

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Published Reports on Librium: 1. T. H. Harris, **Dis. Nerv. System, 21**:(Suppl.), 3, 1960. 2. L. O. Randall, **ibid.**, p. 7. 3. J. M. Tobin, I. F. Bird and D. E. Boyle, **ibid.**, p. 11. 4. H. A. Bowes, **ibid.**, p. 20. 5. J. Kinross-Wright, I. M. Cohen and J. A. Knight, **ibid.**, p. 23. 6. H. H. Farb, **ibid.**, p. 27. 7. C. Breitner, **ibid.**, p. 31. 8. I. M. Cohen, Discussant, **ibid.**, p. 35. 9. G. A. Constant, **ibid.**, p. 37. 10. L. J. Thomas, **ibid.**, p. 40. 11. R. C. V. Robinson, **ibid.**, p. 43. 12. S. C. Kaim and I. N. Rosenstein, **ibid.**, p. 46. 13. H. E. Ticktin and J. D. Schultz, **ibid.**, p. 49. 14. J. N. Sussex, **ibid.**, p. 53. 15. I. N. Rosenstein, **ibid.**, p. 57. 16. D. C. English, **Curr. Therap. Res., 2**:88, 1960. 17. T. H. Harris, **J.A.M.A., 172**:1162, 1960.

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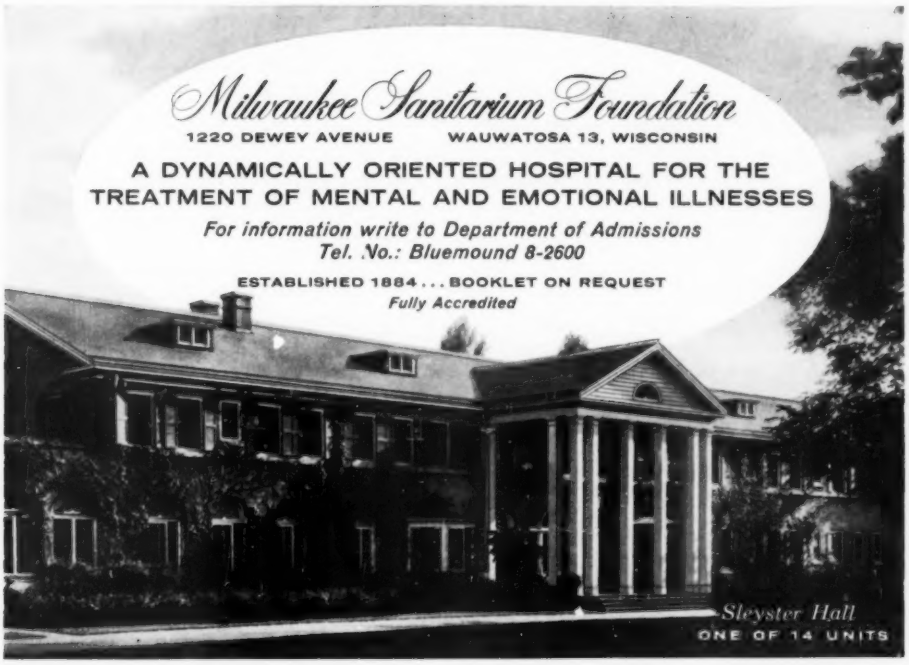
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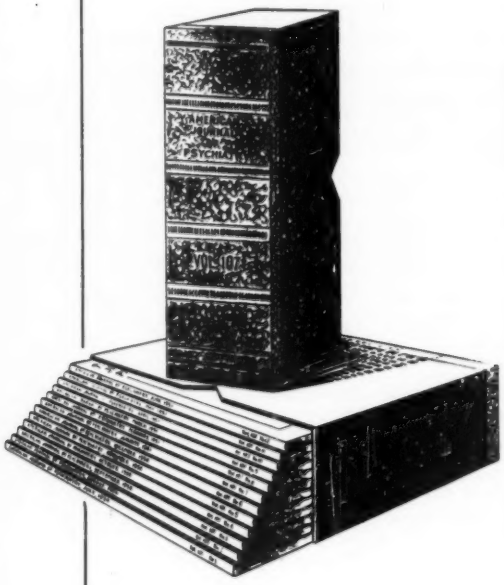

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